MICRO COMPUTER

PRINTOUT®

JUNE
95p

on test:
The VIC HOME COMPUTER

PET SHOW Guide

How BASIC works

COMPUTER JARGON EXPLAINED

plus ☆ *Latest news about personal computing*
☆ *DMS business filing system reviewed*
☆ *Help with programming problems*

commodore

PET PACK software

DIRECT FROM

audiogenic

(WE MANUFACTURE THEM)

The Commodore range of Petpack Software is big and getting bigger! At the moment there are over 60 Petpacks and new programs are being added all the time. Here at Audiogenic we hold stocks of every Petpack and GD series disc, ready for immediate despatch.

For the Businessman we have programs for Stock Control, Filing, Accounts, Payroll, a very powerful Word Processor, and more!

For Eductional applications we have programs to aid in the tuition of Languages, Physics, Maths, English, Pet Programming, Statistics, etc.

For the Scientist or Engineer we have programs on Mechanics of Materials, Harmonic Analysis, Circuit Design, Drawing Load and Die Design, Statistical Analysis, Geometry and Algebra, to mention but a few. Then for the Programmer, there is a selection of Programming Aids on cassette and disc. And, of course, there are the Games Petpacks! Fun for all the Family! There are at present 12 cassettes in the Treasure Trove series, with over 40 different games in all. The Arcade series has 6 games which will be familiar to those of you who frequent pubs, clubs or amusement arcades. The games are PET versions of those popular pastimes like the addictive 'Space Invaders' or the universe-encompassing 3D Startrek.

Get our catalogue for the exciting details.

We also supply for your PET

CONNECTICUT MICRO
A range of analog to digital conversion equipment with up to 16 inputs for the collection of information. Temperature probes and software provided, all at prices starting at around £90.00. Also a range of IEEE to RS232 converters which are addressable and uni- or bi-directional. Prices start at £65.00

A B COMPUTERS VISIBLE MUSIC MONITOR
This unit is absolutely phenomenal. It actually displays music (staves, notes, signature etc.) on the screen and plays it at the same time. It will handle 4 part harmonies and you can add or delete notes with simple keyboard commands. It's a sort of musical word processor. Ideal for computer music freaks, whether rock, classical or budding "Stockhausens". Comes complete with notes, 8 bit D/A converter and some beautiful pieces of music inc. Maple Leaf Rag and some Bach. Excellent value at £39.50 inc. VAT plus 25p P+P.

Stop Press

Now available the new* OSBORNE-McGraw Hill *PET/CBM Personal Computer Guide covering basics 1-4 discs and printers as well as the PET itself, all at the same price!

BOOKS
Over 15 titles from Prentice Hall International, OSBORNE/McGraw-Hill, BYTE BOOKS, **SIGMA,** **MOS** and **COMPUTABITS.** All the titles have been selected with the PET user in mind, and the range includes books on PASCAL, GRAPHICS, PROGRAMS, IEEE BUS, CIRCUITS, HARDWARE, etc. Don't forget the PET/CBM Personal Computer Guide at £9.25 plus £1.00 p+p.

BASIC 4 and DOS 2 CONVERSION
BASIC 4 gives your new ROM PET all the commands of the new 80 column PETs. DOS 2 goes in your disk drive and is necessary when using BASIC 4 or may be used on its own to get rid of initialisations every time you use a disk. Both sets are priced at £43.70 inc. VAT + 50p P+P each.

ACCESSORIES
SOUND BOARDS, DISKS, CASSETTES, ROMS, DISK HOLDERS, PETSET (GETS YOU OUT OF CRASH), DEMAGNETISER, RIBBONS see catalogue for full details.

P.O. Box 88 Reading, Berkshire,
Tel: (0734) 595269 24 Hour.

Every PET™ Needs a Friend.

CURSOR is the best friend your Commodore PET will ever have. Since July, 1978 we have published 150 of the most user-friendly programs for the PET available anywhere. When we write or edit a program, we spend lots of time fussing about how it will treat you. We pay attention to lots of little things that help make using a computer a pleasure instead of a pain.

Naturally, **CURSOR** programs are technically excellent. Each program that we purchase is extensively edited or re-written by a professional programmer. But *imagination* is just as important as being user-friendly and technically good! We delight in bringing you off-beat, unusual programs that "show off" the abilities of your PET or CBM.

CURSOR is user-friendly, technically great and full of imaginative programs. And every issue of **CURSOR** is still available! We continue to upgrade previously published programs so that they'll work on the three varieties of Commodore ROM's (Old, New, and 4.0). New issues from 23 also work on the 80 column CBM.

For only £3.75 inc. p+p & VAT you can buy a sample issue and judge for yourself. Or send £22.50 inc. p+p & VAT for a six-issue subscription. Each **CURSOR** comes to you as a cassette with five programs and a graphic Front Cover, including the famous **CURSOR** notes to keep you up to date with the state of PETs in the States! ready to LOAD and RUN on your PET.

Who knows? After your PET meets **CURSOR**, things may never be the same!

Distributed in the U.K. by:

AUDIOGENIC LTD.
34-36 Crown Street,
Reading, Berkshire.

or from your Local Dealer

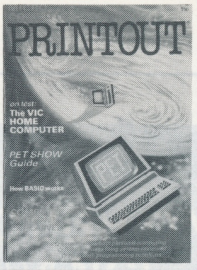
Published By:

THE CODE WORKS

PRINTOUT

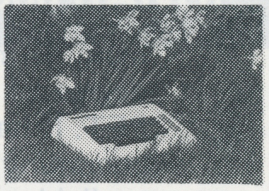
Volume 2 Number 5

June 1981



THE VIC REPORT

What it will do; what it won't. We test Commodore's £189 baby computer - with surprising results. **28**

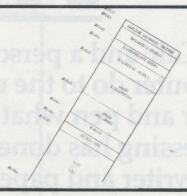


WHAT'S IT WORTH?

An in-depth investigation of Commodore's Approved PET Products Scheme. **38**

HOW BASIC WORKS

What the PET does everytime you enter a line of BASIC. **48**



COMPUTER JARGON EXPLAINED **25**

INTERFACES Where to find the right one for you **31**

PET SHOW GUIDE to all the new products that will be on show. **44**

MINI DIGITAL CASSETTE RECORDER We review a fast alternative to the standard cassette unit. **43**

BUSINESS ROMS Why plug-in chips for businessmen may just catch on. **23**

PETS & PIECES Gavin Sanders investigates Intellivision, and solves the tape problem. **27**

TOMMY'S TIPS Your programming problems solved here. **47**

PERSONAL ELECTRONIC TRANSACTIONS Gregory Yob explains how to use PET's TIme function. **20**

DMS Just how good is Compsoft's Data Management Software? **52**

PEEKS & POKES Salacious gossip from the world of computers. **62**

plus READ/WRITE Letters, 11 HOTLINE News, 16
Screen Prompts, 37 Reducing Significant Figures, 55

Editorial

Publisher Julian Allason
Editor Terry Hope
Associate Editor Terry Hope
Art Editor Denis Appleby
Technical Editor Tommy Turnbull
Contributing Editors: Dennis Jarrett, Lindsay Doyle, Gregory Yob, John Nuttall, Gavin Sanders
Address: P.O. Box 48, Newbury RG16 OBD
Telephone: 0635-201131
Telex: 339396 Attn.Printout

Production

Production Manager Wendy Cheetham
General Manager Jessica Allason

Advertising

Advertising Manager Jonathan Horne
Address: Printout Advertisement Office, North Warnborough, Basingstoke RG25 1PB
Telephone: Odiham (025671) 2724
Telex: 339396 Attn. Printout

What are PRINTOUT talking about?

" **Conclusions**
A *very well thought-out program* that is *very user friendly.* I am sure this program is going to be a very useful tool in many firms, both small and large. And it's good to see a degree of excellence and professionalism in material for the PET. It has the added attraction that *no knowledge of programming languages is needed for the operator.* All this is available at a *very modest price* and must represent *good value for money.* The facilities available are very good and it is seemingly impossible to crash the system."

VISICALC of course!

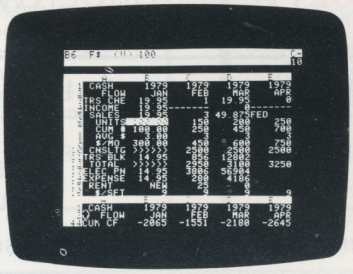
VisiCalc and a personal computer do to the calculator, paper and pen what word processing has done to the typewriter and paper. Revolutionize it.

Take virtually any problem you would explore using calculator, pen, and paper, working in rows and columns. Apply VisiCalc and you'll see why every reviewer of this product has said the same thing: VisiCalc is the most useful, most important program yet developed for personal computing.

With VisiCalc, you work with an electronic worksheet of up to 63 columns and 254 rows. At the juncture of any column and row you can type in words or numbers. To put VisiCalc to work, you first create any format or form you need by typing in words—just like writing column headings across the top of a piece of paper and items down the left side. Then, where you want the worksheet to perform a calculation, you type a formula. VisiCalc automatically performs all arithmetic functions, net present value, and transcendental functions. Instantly—and we mean instantly—VisiCalc displays the results. And if you change any of the numerical data, the electronic worksheet instantly displays a new result. Automatically. You can play "what if" as often as you wish to solve thousands of different problems. When finished, you can get a hard copy of all the information on your worksheet from your computer printer.

Absolutely no programming is necessary. VisiCalc does all the work. Now, isn't *that* magic?

To see how VisiCalc works, visit your Personal Software dealer. To find out how VisiCalc can be a worksaver for you, use your imagination.



Who is using VisiCalc.

Anyone who works with numbers.

MANAGERS and MANAGEMENT CONSULTANTS plan budgets, compare actual results to budgeted forecasts, and modify projections faster than ever before. VisiCalc is the most powerful and easy-to-use projection tool ever developed.

FINANCIAL ANALYSTS quickly determine rate-of-return under varying assumptions using the built-in net present value functions. VisiCalc will also compute financial ratios, and project tax consequences.

ACCOUNTANTS develop financial statements and *pro formas,* making changes and comparisons easily with VisiCalc's ultimate "what if" recalculation feature.

TAX ACCOUNTANTS compute the tax effects of many alternatives, and print out all the different scenarios for client discussion and documentation.

ENGINEERS and SCIENTISTS appreciate VisiCalc's transcendental functions, scientific notation, and features like eleven-digit precision in numeric calculations.

MARKETING MANAGERS find VisiCalc is the answer to every forecasting and budgeting need. They refine assumptions—commission rates, sales costs, advertising expenditures, leads, sales closing percentage—and watch the effect on the bottom line.

A Demonstration Will Tell The Story.

Visit a Personal Software dealer and see this amazing tool. You'll be discovering features and uses right away. And for a long time after.

ACT MICROSOFT

Shenstone House, Dudley Road, Halesowen, West Midlands.
Tel. 021-501 2284 Twx: 339396

PET is the trademark of Commodore Systems. Apple is the trademark of Apple Computers.

[ ] **Rush me free details of VisiCalc**
[ ] **I enclose £125 + VAT for PET/Apple VisiCalc**

Name: .....

Address: .....

.....

..... **Postcode:** .....

Credit card holders may order by telephoning

MMS
Computer Systems

announces —
ACCOUNTING BREAKTHROUGH ON COMMODORE 3000 & 8000 RANGE

Fully integrated and balancing ledger system

- Sales and Purchases Ledgers
- Open Item
- Large Capacities
- Multi Ledgers
- Multi Companies
- Nominal and VAT Ledgers
- One set of Disks
- Simple to Operate
- Powerful
- Period End Audit Reports

CONTACT US AT STAND 17
AT THE PET SHOW

OR TELEPHONE
JOHN PERCIVAL
0234-40601

To MMS Ltd.
26 Mill St., Bedford MK40 3HA
Please send details of MICROFACTS to:

Name .....

Company .....

Address .....

.....

The Commodore PET offers you a safe passage through the primeval swamp of computerisation.

The miracle of microchip technology has made the main-frame computer seem like a dinosaur. But how many microcomputers will go the same way?

Without good software and support a micro-computer is less capable than your office calculator. So as competition grows amongst manufacturers in this industry, only those with the finest software and the best supporting facilities will survive.

SHARE A SECURE FUTURE WITH A COMMODORE PET

We at Commodore have been producing high technology products for over 20 years. And unlike most other manufacturers of micro-computers, we make everything ourselves (including the silicon chips) to keep our costs to a minimum.

These cost savings are passed on to you in excellent value for money. So you can now buy a self-contained Commodore PET microcomputer for **£450**, or a complete business system (including Floppy Disk Unit and High Speed Printer) starting from as little as **£2000**.*

However, computer hardware can only be as good as the software available. That's why, to maintain our position as

Britain's most popular microcomputer, we have made sure that the quality and versatility of our software is second to none.

LARGEST, FINEST CHOICE OF SOFTWARE...

To complement our microcomputers, we have the finest and most comprehensive range of programs available in the U.K. today. This covers everything from such important business applications as Payroll, Stock Control, Accounting, Filing, Mailing; to our series in the field of Education. Each program is thoroughly tried, tested and tailored to BRITISH needs. You won't catch us palming you off with an irrelevant American version!

...AT SURPRISINGLY LOW PRICES

With over 30,000 Commodore PETs employed in Britain, the demand for programs is tremendous. And through mass-production we are able to keep our costs to you surprisingly low. So you can buy a Petpack program (on cassette) for between £5 and £50, while business programs (on disk) range from between £50 and £500.

OUR OWN UNIQUE TRAINING COURSES

Commodore programs are designed with operational simplicity in mind. Commands are in plain English and guidance is built into each package. So that even a stranger to computers can quickly feel at home with a PET.

Nevertheless, to maximise the potential of your Commodore system, you will find a certain amount of training of immense value. Of the well-known names in microcomputers, Commodore is the only one to offer a range of training courses and seminars. And these have already proved of great benefit to thousands of PET users.

KEEP IN TOUCH WITH THE PET USERS' NEWSLETTER

Another unique way in which Commodore helps you get the most out of your microcomputer is by publishing the regular PET Users' Newsletter. For an annual subscription of only £10 you can keep up-to-date with developments and share new ideas and applications with over 3,000 PET users.

WORDPROCESSOR AS WELL AS COMPUTER

In addition to Commodore's own high quality range of hardware and software, there are compatible products of other manufacturers which have gained our official stamp of approval.

Look out for this sign.

You'll find it on such famous programs as WORDPRO and WORDCRAFT, which turn your PET into a first-class wordprocessor; as well as on hardware like the MUPET system, which allows a number of PETs to be run with a single, letter-quality printer.

PROFESSIONAL DEALER SUPPORT COUNTRYWIDE

When you consult a Commodore dealer, you won't find yourself talking to a typewriter salesman. Our dealers are qualified to examine your needs, and to demonstrate which hardware and software will suit you best. Trained engineers are at hand and a 24-hour field maintenance service is available countrywide.

LONDON AREA

Adda Computers Ltd, W13, 01-579 5845
Advanced Management Systems, EC2, 01-638 9319
C.S.S. (Business Equipment) Ltd, E8, 01-254 9293
Centralex – London Ltd, SE13, 01-318 4213
Computer Sales & Software Centre Ltd, ILFORD, 01-554 3344
Cream Computer Shop, HARROW, 01-863 0833
Da Vinci Computer Shop, EDGWARE, 01-952 0526
Henderson Bennett, SE25, 01-654 5609
Home and Business Computers, E12, 01-472 5107
L & J Computers, NW9, 01-204 7525
Logic Box Ltd, SW1, 01-222 1122
Merchant Systems Ltd, EC4, 01-353 1464
Micro Computer Centre, SW14, 01-878 7044
Micro-Facilities Ltd, HAMPTON HILL, 01-979 4546
Sumlock Bondain Ltd, EC1, 01-250 0505
Sumlock Bondain Ltd, EC4, 01-626 0487

HOME COUNTIES

Millhouse Designs Ltd, ALTON, 84517
H.S.V. Ltd, BASINGSTOKE, 62444
MMS Ltd, BEDFORD, 40601
D.D.M. Direct Data Marketing Ltd, BRENTWOOD, 214168
Amplicon Micro Systems Ltd, BRIGHTON, 562163
T & V Johnson (Microcomputers Etc) Ltd, CAMBERLEY, 20446
Cambridge Computer Store, CAMBRIDGE, 65334
Wego Computers Ltd, CATERHAM, 49235
Dataview Ltd, COLCHESTER, 78811
Amplicon Micro Systems Ltd, CRAWLEY, 26493
S.M.G. Microcomputers, GRAVESEND, 55813
South East Computers, HASTINGS, 426844
Bromwall Data Services Ltd, HATFIELD, 60980
Alpha Business Systems, HERTFORD, 57425
Commonsense Business Systems Ltd, HIGH WYCOMBE, 40116
Kingsley Computers Ltd, HIGH WYCOMBE, 27342
Brent Computer Systems, KINGS LANGLEY, 65056
Computopia Ltd, LEIGHTON BUZZARD, 376600
South East Computers Ltd, MAIDSTONE, 681263
J.R. Ward Computers Ltd, MILTON KEYNES, 562850
Sumlock Bondain (East Anglia) Ltd, NORWICH, 26259
T & V Johnson (Microcomputers Etc) Ltd, OXFORD, 721461
C.S.E. (Computers), READING, 61492
Slough Microshop, SLOUGH, 72470
Business Electronics, SOUTHAMPTON, 738248
H.S.V. Ltd, SOUTHAMPTON, 22131
Super-Vision, SOUTHAMPTON, 774023
Symtec Systems Ltd, SOUTHAMPTON, 38868
Stuart R Dean Ltd, SOUTHEND-ON-SEA, 62707
The Computer Room, TUNBRIDGE WELLS, 41644
Orchard Computer Services, WALLINGFORD, 35529
Photo Acoustics Ltd, WATFORD, 40698
Microchips, WINCHESTER 68085
P.P.M. Ltd, WOKING, 80111
Petalect Electronic Services Ltd, WOKING, 69032
Oxford Computer Systems, WOODSTOCK, 812838

MIDLANDS & S. HUMBERSIDE

C.B.S. Consultants, BIRMINGHAM, 772 8181
Computer Services Midlands Ltd, BIRMINGHAM, 382 4171
Marchant Business Systems Ltd, BIRMINGHAM, 706 8232
Micro Associates, BIRMINGHAM, 328 4574
Peach Data Services Ltd, BURTON-ON-TRENT, 44968
Jondane Associates Ltd, COVENTRY, 664400
Davidson-Richards Ltd, DERBY, 366803
Allen Computers, GRIMSBY, 40568
Caddis Computer Systems Ltd, HINCKLEY, 613544
Machsize Ltd, LEAMINGTON SPA, 312542
Arden Data Processing, LEICESTER, 22255
Roger Clark Business Systems Ltd, LEICESTER, 20455
Lowe Electronics, MATLOCK, 2817
A.J.R. Office Equipment Services Ltd, NOTTINGHAM, 206647
Betos (Systems) Ltd, NOTTINGHAM, 48108
PEG Associates (Computer Systems Ltd), RUGBY, 65756
Walters Computer Systems Ltd, STOURBRIDGE, 70811
System Micros Ltd, TELFORD, 460214

YORK & N. HUMBERSIDE

Ackroyd Typewriter & Adding Machine Co. Ltd, BRADFORD, 31835
Microprocessor Services, HULL, 23146
Holdene Ltd, LEEDS, 459459
South Midlands Communications Ltd, LEEDS, 782326
Yorkshire Electronics Services Ltd, MORLEY, 522181
Computer Centre (Sheffield) Ltd, SHEFFIELD, 53519
Hallam Computer Systems, SHEFFIELD, 663125
Holbrook Business Systems Ltd, SHEFFIELD, 484466

NORTH EAST

Currie & Maughan, GATESHEAD, 774540
Elfton Ltd, HARTLEPOOL, 61770
Dyson Instruments, HETTON, 260452
Fiddes Marketing Ltd, NEWCASTLE, 815157
Format Micro Centre, NEWCASTLE 21093
Intex Datalog Ltd, STOCKTON-ON-TEES, 781193

S. WALES & WEST COUNTRY

Radan Computational Ltd, BATH, 318483
C.S.S. (Bristol) Ltd, BRISTOL, 779452
T & V Johnson (Microcomputers Etc) Ltd, BRISTOL, 422061
Sumlock Tabdown Ltd, BRISTOL, 276685
Sigma Systems Ltd, CARDIFF, 34869
Reeves Computers Ltd, CARMARTHEN, 32441
A.C. Systems, EXETER, 71718
Milequip Ltd, GLOUCESTER, 411010
Jeffrey Martin Computer Services Ltd, NEWQUAY, 2863
Devon Computers, PAIGNTON, 526303
A.C. Systems, PLYMOUTH, 260861
J.A.D. Integrated Services, PLYMOUTH, 62616
Business Electronics, SOUTHAMPTON, 738248
Computer Supplies (Swansea), SWANSEA, 290047

NORTH WEST & N. WALES

B & B (Computers) Ltd, BOLTON, 26644
Tharstern Ltd, BURNLEY, 38481
Megapalm Ltd, CARNFORTH, 3801
Catlands Information Systems Ltd, CHESTER, 46327
Catlands Information Systems Ltd, WILMSLOW, 527166

LIVERPOOL

Aughton Microsystems Ltd, LIVERPOOL, 548 7788
Stack Computer Services Ltd, LIVERPOOL, 933 5511

MANCHESTER AREA

Byte Shop Computerland, MANCHESTER, 236 4737
Computastore Limited, MANCHESTER, 832 4761
Cytek (UK) Ltd, MANCHESTER, 872 4682
Executive Reprographic Ltd, MANCHESTER, 228 1637
Professional Computer Services Ltd, OLDHAM, 061-624 4065

SCOTLAND

Gate Microsystems Ltd, DUNDEE, 28194
Holdene Microsystems Ltd, EDINBURGH, 668 2727
Gate Microsystems Ltd, GLASGOW, 221 9372
Robox Ltd, GLASGOW, 8413
Thistle Computers (Macmicro), INVERNESS, 712774
Ayrshire Office Computers, KILMARNOCK, 42972
Thistle Computers, KIRKWALL, 3140

N. IRELAND

N. Ireland Computer Centre, HOLLYWOOD, 6548

This list covers dealers participating in our advertising. *Prices quoted ex. VAT.

Free literature pack

For your free literature pack send off the coupon to the address below.

Name _____ Position _____

Address _____

Intended application _____ 08P01/ 08P02

commodore

Commodore Information Services, 818 Leigh Road, Slough, Berks. SL1 4BD

DTL - BASIC

A Basic COMPILER for a new and better way of running programs on your Commodore Microcomputer

DTL-BASIC is a compiler that is 99% compatible with existing BASIC programs running on your PET.

Consider these benefits to you:-

1. Compiled programs run much faster: typically for large programs 10-20 times faster.
2. DTL-BASIC is almost totally compatible with the Interpreter - use the Interpreter for program development and then compile for efficient running.
3. The Compiler implements true integer arithmetic.
4. The Compiler will accept extensions to BASIC.
5. Compiled programs require half as much store - allows the implementation of very big BASIC programs.
6. Compiled programs cannot be listed or altered.

DTL-BASIC is disk based, requires a 32K PET and comes complete with an in-depth users manual.

Version 1 for 3032 & 3040	£300.00
Prices exclude VAT.	
Version 2 for 4032 & 4040	£300.00
Version 3 for 8032 & 8050	£360.00

Special prices for educational establishements - ask for details.

Available from your local CBM Dealer or more details from:

Dataview Ltd., Portreeves House, East Bay, Colchester, Essex. Tel: 0206 865835

Dataview

Wego Computers Ltd

Wego Paycheck

£425
+V.A.T.

- The first micro-payroll with a history disk.
- Full holiday credit facilities.
- No special stationery required.
- Cash round-up to simplify making wage-packets.

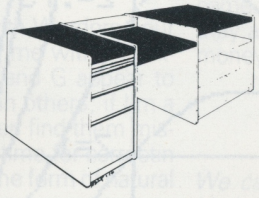
These are the special features of this advanced package. Of course, all the normal standard payroll features are incorporated.

As your COMMODORE dealer for a demonstration of this user-friendly program.

CBM approved
£75 + VAT

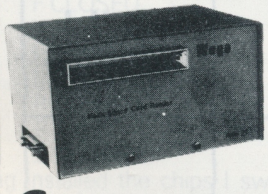
Wego Sequential Switching Unit

Allows up to 5 devices to be connected to the mains, and with one switching operation power up and down all the devices, in the correct sequence.



The PET desk

Special lower section for keyboard. Ample space for disk-drives & other peripheral devices. Lower drawer accepts A4 suspended files.



CBM approved
Prices from **£620 + VAT**

Mark Sense Card Reader

"A pencil, a card, and this low-cost reader. . . it's the new, fast way to enter data into your microcomputer." Versions available able to communicate with PET, APPLE, TRS-80, or any S100 or RS232 bus. Ideal for business and education applications.

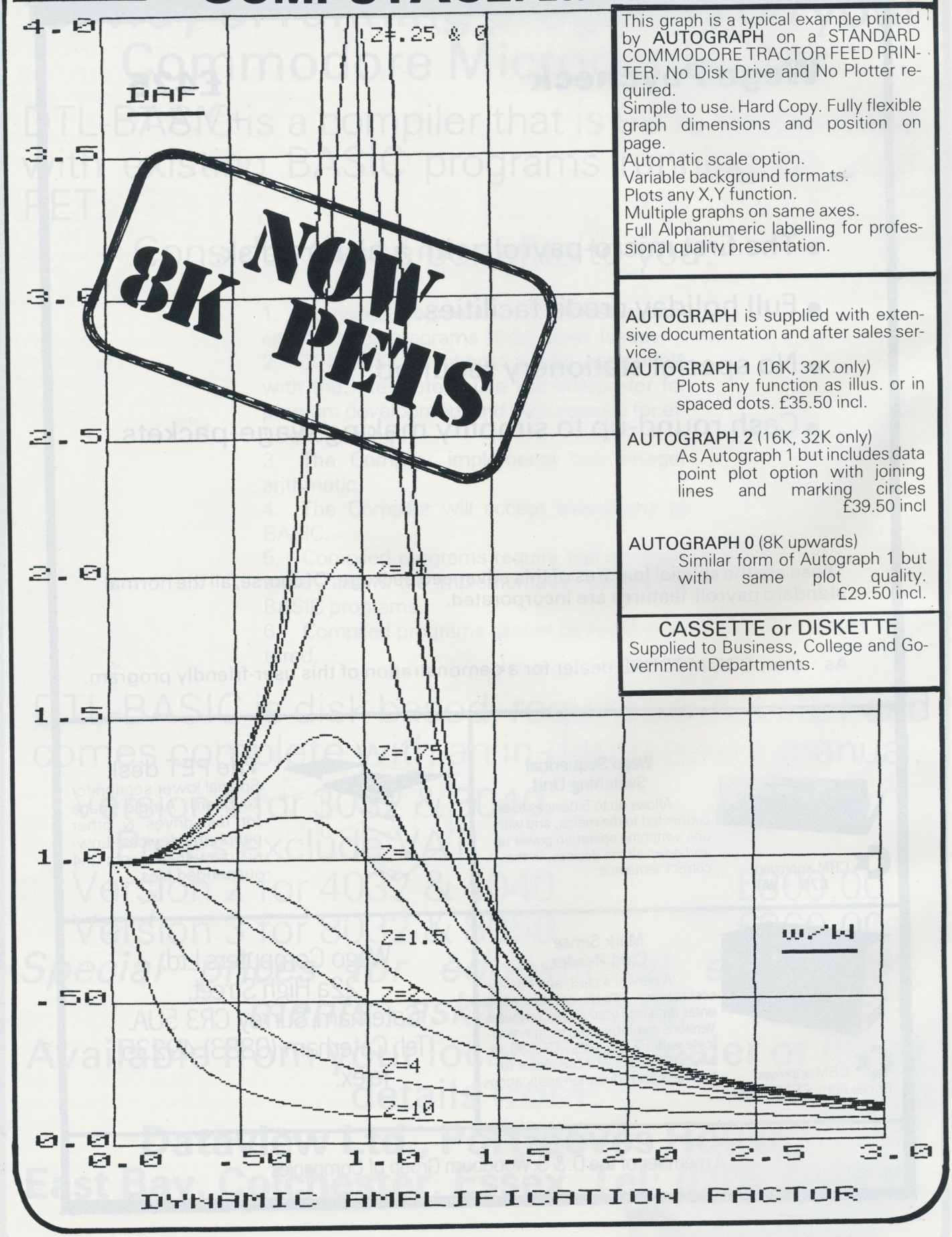
Wego Computers Ltd.,
22a High Street,
Caterham, Surrey, CR3 5UA.
Tel: Caterham (0883) 49235
Telex:

A member of the D. & S. Woodburn Group of Companies

PET PRINTER GRAPHICS

by COMPUTACE. Ltd.

INFABCO HOUSE, 552 LONDON RD.,
NORTH CHEAM, SUTTON, SURREY.



NOW 8K PET'S

This graph is a typical example printed by **AUTOGRAPH** on a STANDARD COMMODORE TRACTOR FEED PRINTER. No Disk Drive and No Plotter required.
Simple to use. Hard Copy. Fully flexible graph dimensions and position on page.
Automatic scale option.
Variable background formats.
Plots any X,Y function.
Multiple graphs on same axes.
Full Alphanumeric labelling for professional quality presentation.

AUTOGRAPH is supplied with extensive documentation and after sales service.

AUTOGRAPH 1 (16K, 32K only)
Plots any function as illus. or in spaced dots. £35.50 incl.

AUTOGRAPH 2 (16K, 32K only)
As Autograph 1 but includes data point plot option with joining lines and marking circles £39.50 incl

AUTOGRAPH 0 (8K upwards)
Similar form of Autograph 1 but with same plot quality. £29.50 incl.

CASSETTE or DISKETTE
Supplied to Business, College and Government Departments.

READ/WRITE

Canute

You people deserve to fry in hell. Every issue of your magazine encourages more people to buy computers and more jobs to be lost. I hope you go out of business soon.

Ron Harvey,
310 Fulham Road,
London S.W.10.

Then seven more jobs would be lost, Mr. Harvey. Actually it is doubtful whether computers really are a cause of job loss. What little evidence there is points to a ***net*** *gain.*

Adding Memory to your PET

I purchased my CBM 3008 from an official Commodore dealer here in Dublin shortly before Christmas. I had hoped to buy a 3032, especially as the dealer had informed me that memory expansion was not recommended for the 3008 or the 3016. Unfortunately I simply did not have enough cash at the time.

As I have some electronics experience I decided to lift the lid of the 3008 to see if it might be possible to add some memory. I found one bank of 8 RAMs and a bank of empty spaces - the holes were, for some strange reason, filled with solder. I therefore concluded that one could at the very least add 8 1K memory chips.

At the end of January I contacted the Comp.Shop in Dublin and they quoted a minimum price of £200 for memory expansion. As I had no intention of paying such a price, I decided to purchase the required RAMs and install them myself. Texas Instruments quoted £9 per RAM plus VAT. I then saw an advertisement by Microdigital offering 16x4116 RAMs at not much more than £30 so I decided to place an order. However, they being very honest, wrote back pointing out that as the manufacturer usually drills large holes in the P.C.B. the 3008 cannot be expanded simply by installing 4116 RAMs.

Last week I finally purchased the 16 RAMs. I removed the 1K RAMs. There were soldered on both sides of the board with the result that they were almost impossible to unsolder without causing damage so I cut the legs. I then installed 16 sockets because I was not yet 100% sure my expansion would work.

I set the links as follows:-

A OPEN
B OPEN
C CLOSED
D CLOSED
E OPEN
F CLOSED
H CLOSED
I , J , K CLOSED
L , M , N OPEN
P CLOSED
R OPEN
S CLOSED

Having installed the chips I switched on and to begin with flashes of random 'noise' appeared on the screen, which then went blank. I must admit that I was worried, especially as I had cut the legs of the 1K chips, but I soon discovered that a very small solder bridge was the cause of my problems.

All of this raises two questions: Is Commodore trying to prevent the user from expanding by making it difficult to add extra RAM, and secondly, what is the true value of a 4116 RAM. The chips obtained from Microdigital were supplied by ITT. How is it that TI could quote £9 for RAMs that were not PRIME GRADE or Burned-in?

William Murphy,
3 Woodlands Drive,
Stillorgan,
Blackrock, Dublin

You are dead right, Bill. Commodore don't encourage or support upgrades on 8K or 16K machines; most dealers therefore advise customers to buy the biggest machine they can afford. That certainly is more economic than upgrading, but it doesn't help you much. The price of RAM chips varies a great deal. The going rate in the trade is between £1 and £1.50 for 16K RAM chips - that is 16K bits or 2K bytes, incidentally - so allowing for profit margin, Microdigital's price of £30 for 16 sounds fair. The TI chips are exactly what they say, not prime grade and not burnt it. This indicates a certain amount of risk and doubtful recourse to the manufacturer in the event of failure. Our advice: steer well clear.

It is possible to upgrade certain PETs by adding additional RAMs or replacing those in situ. But, as Commodore's Boffin-in-Chief, Dave Briggs has observed, removing and resoldering 16-pin integrated circuits, even if you do cut out the originals, is no job for an amateur solder merchant; in fact it has proved to be beyond some "professionals". We would recommend approaching a reputable electronics engineer to do the job. As a rough guide, the cost is likely to be from £30 to £40 to upgrade a 3016 to 3032 on an undrilled board, to anywhere between £60 and £120 to upgrade a 3008 to 3032 on a board which has been drilled. The unknown factor in all this is where the chips are obtained from and how long they have been in stock. Bear in mind that upgrading will void your warranty, in the unlikely event that you are still in it.

For prospective purchasers our advice is quite clear. Buy as much memory as you can afford, to start with. You always need more than you think.

Cockney Keyboard

My keyboard, combined with Wordpro Four Plus, seems to be imbuing me with a cockney accent. The letters H and G appear to need a little more force than others; if I'm a bit asty in strikin them I often find them missin, and I don't always ave time for correctin them. This seems to be some form of natural

geographic migration; my last machine was Dutch, for it kept bouncing A's and E's and producing phrases like prograams for begginneers. I hope that I don't continue to move west; I don't know if I could bear to operate an Irish system....

Jim Butterfield
Toronto, Ontario,
Canada

Geere vs. Sanders Part XIV

Don't believe Uncle Gavin! His advice (April PRINTOUT) on how to use the monitor is vintage Sanders; that is to say entertaining but impractical. Entering M 0400 0500 will cause about half of the information to scroll off the screen, so unless you are adept at speed reading, use M 0400 047F then M 0480 04FF. By using the number ranges XX00 to XX7F and XX80 to XXFF only one screenful of information is presented at a time. Gavin should read some of the tomes recommended in the quite excellent Guide to Computer Books in the same issue.

Ron Geere,
109 York Road,
Cove, Farnborough.

Gavin Sanders said a number of interesting foreign words when we showed him Ron's letter. As Ron was the author of our book guide, we think Gavin must have been commending his modesty.

Now it's Doyle vs. Sanders

It's also possible (referring to Gavin Sanders' column in the April PRINTOUT) to split the world into those who have their ducks in line and those who don't, and Gavin is in the latter department today. To set him straight:

The game of LIFE was not invented by Martin Gardner and he is not a regular columnist for Scientific American, having recently retired from that position. In any case, calling him a columnist is like calling Winston Churchill a writer of history books. The real inventor was John Conway, one of our boys, a mathematician at Cambridge at the time. Enthusiasts for the game would have realised what Gavin was excited by if he had told them that Commodore's ULTIMATE LIFE has a field of 128 by 128, ten stored starting patterns, optional recurved universe, and instant switching from single-pixel to quarter-pixel resolution. I would give the author credit if I know who she were.

I have had trouble convincing people that I do not write for PRINTOUT under the pseudonym "Gavin Sanders" as well as my own name. I wish you would get this straight, as they also usually try to collect from me the money Gavin owes them.

Lindsay Doyle,
Hotel du Grand Porc,
Lyons

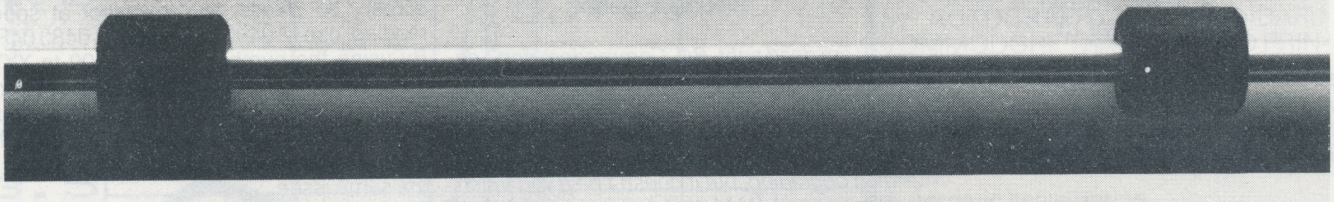
We can confirm that Gavin Sanders is not Lindsay Doyle and vice versa. Now about that loan....

8010 Modem Bug

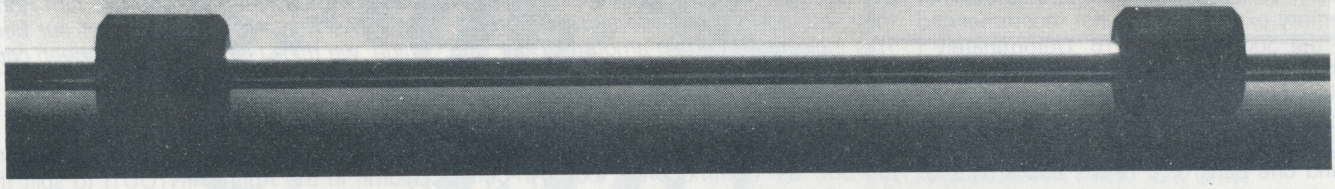
I would like to take issue with Mike Whitehead over his letter referring to the Commodore 8010 Modem Bug. His statement that the 8010 can be driven successfully by means of the SRQ line is perfectly accurate - however, that is *not* the point at issue. Perhaps if I explain what the problem is with the 8010, the situation will become clearer.

When reading characters from an IEEE device, the PET addresses the device, requests a character to be transmitted from the device onto the IEEE bus, and waits for up to 64 milliseconds for the character to appear. If no character is forthcoming, the PET "Times Out", untalks the device, and returns a value of 2 in ST to indicate that a timeout has occurred. If the 8010 modem happens to be in the process of receiving a character at the same time as the PET decides to time-out, the UNTALK sequence issued by the PET causes that character to be lost. Contrary to popular opinion, this effect occurs regardless of the mode of operation of the modem - I can say this with authority, as we at Cortex spent a considerable amount of time testing the mo-

IF YOU DON'T WANT A WORD PROCESSING DOCUMENT THAT LOOKS LIKE THIS.



YOU NEED A PRINTER THAT PRINTS LIKE THIS.



The more your system can do, the better your terminal should be. That's why, if you're adding text editing capability to your data processing system, you should also think about adding a quality daisywheel terminal to replace the matrix terminal you're using now. And the best-quality terminal you can buy is one by Qume.

A printer for every application.

No matter what application you choose, Qume makes a printer to fit it.

Like our Sprint 5® KSR and RO, which have achieved the reputation for being the easy-to-use leader in letter-perfect terminals. You can have 50 different typestyles to use with it, including APL, scientific symbols and international character sets.

And there's the Sprint 5 Wide-Track™ with RS-232C interface. The first character printer data terminal in the world capable of handling paper up to 28 inches wide. That's a full 264-column printing area. Sprint 5 Wide-Track adds an entirely new dimension to the printed word.

The best backup in the business.

Not only do we make the best printers, but we also provide the best support to back up what we sell. That means excellent service to the OEM and the end user, and one of the best supplies programs in the business.

So if you're getting ready to upgrade your system, then it's time you upgraded your printer as well. To a Qume.

For more information contact your Qume [UK] AUTHORISED DISTRIBUTOR

ACCESS DATA COMMUNICATIONS LTD.,
228 High Street, Uxbridge, Middlesex. Tel: (0895) 30831.

DAISY TERMINALS LIMITED, Bridge Road,
Haywards Heath, West Sussex. Tel: (0444) 57546.

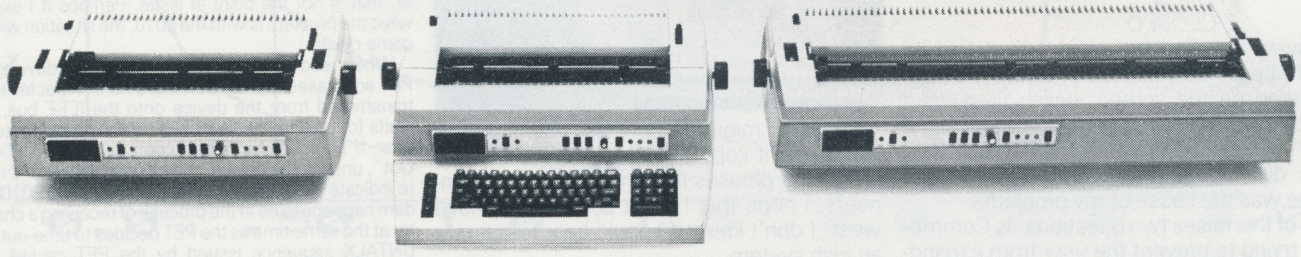
FACIT, Maidstone Road, Rochester, Kent.
Tel: (0634) 401721.

ISG DATA SALES LIMITED, Unit 9, Fairacres Ind. Estate,
Dedworth Road, Windsor, Berkshire. Tel: (07535) 57955.

ROHAN COMPUTING LIMITED, 52 Coventry Street,
Southam, Warwickshire. Tel: (092681) 4045.

Qume®

Qume (U K) Ltd. Tel: 0734 584646. Telex: 849706.



dem, and were in fact responsible for pointing out the nature of the problem to Commodore prior to its release in this country.

In reality, the problem is not with the 8010 itself, but with the way that the PET handles the IEEE handshaking mechanism which it does in a non-standard fashion. Other manufacturers of IEEE devices have encountered similar problems because they started from the false assumption that the PET's IEEE handling adhered to the standard, and have had to engineer round the problem in order not to lose data. Small Systems Engineering is a good example - their interfaces for the PET do not exhibit this problem. Other designs of interface circumvent the problem by returning a character value of 0 when no character is available. This mechanism has the added advantage that the PET is not held up for 64 milliseconds every time the program requests a character from the interface when no character is available, resulting in increased throughput when operating in full duplex.

What it amounts to is that the 8010 is incompatible with the standard mechanisms which are provided within PET BASIC to read data from a peripheral, although the 8010 itself adheres to the IEEE bus standards. The fact that the problem can be "programmed round" is somewhat missing the point. From the point of view of companies such as ourselves who have elected to produce software to drive communications devices, if we spent our lives "programming round" the problems created by the various interfaces on the market, we would get nothing done at all. If you couple this with the other limitations of the 8010, such as its fixed data rate of 300 baud and its inability to insert parity bits when transmitting characters, then we are left with no alternative but to recommend interfaces which can be handled easily, which work, and which are PET compatible. Most notable of these is currently the S.S.E. B300, which has the additional advantage of a 40-character buffer and variable baud rates, and provides RS232 handshaking when used on a direct connection to a mainframe. When used in conjunction with a good acoustic coupler or modem, this interface outperforms the 8010 in all respects.

I was amused by Mike's opening statement that "After *much* investigation we have decided that the only modem which is any good for the PET is the 8010...." - in reality, the 8010 is the *only modem readily available* which will connect directly to the PET so this statement means very little indeed. There are a large number of commercially available modems and acoustic couplers (from Modular Technology, Racal Milgo, British Telecoms etc. etc.) which accept RS232 signals, and will perform perfectly well when driven via a PET with an RS232 interface.

Tony Jeffree,
Cortex Computer Systems Ltd.,
34/36 Bromham Road,
Bedford.

We invited Commodore's new communications manager, Rod Wellbone, to comment: "Mr Jeffree is quite correct when he states that Mr. Whitehead's letter is "perfectly accurate". Mike Whitehead had, shortly after receiving his 8010, proved PET to PET transmission using the SR2 method.

The reasons for opting for the 8010 are obvious. Firstly it is cheaper than the IEEE to RS232 converter plus an acoustic coupler. Secondly it can be serviced by your local CBM dealer rather than having to have three items checked by three independent suppliers. Thirdly it increases the reliability of a communications system.

The computer industry recognises that interconnection causes problems. The 8010 uses less cable and associated plugs and sockets; it also uses less hardware than the alternative solution. It can also transfer files (PET programs) without introducing 00HEX each time characters aren't available."
Back to you, Tony!

Bookworm

I found myself in complete agreement with the conclusions of your Computer Book Guide (April). It is good to see someone who is not afraid to point out the rubbish. Now perhaps you can tell me where I can actually find *The PET Revealed*, *PET/CBM Personal Computer Guide* and *Library of PET Subroutines*. Neither my local bookshop or the dealer from whom I bought my PET has them in stock or shows any interest in ordering them.

Nigel West
Croftdown,
Aldworth, Reading.

Right near you are Audiogenic, who like the other mail order specialists we mentioned, carry virtually all the PET titles. Audiogenic are at 34/36 Crown Street, Reading. Tel.(0734) 595269.

Dud of the Year

In recent copies of Printout Tommy has asked for people to nominate the best program and also the dud program. My nomination for the most frustrating program of the year goes to ACT Microsoft's VisiCalc about which we have heard so much, because it is not available for use with ACT CompuThink disk units.

Dr. F.M. Tayler,
39 Grosvenor Road,
Billingham,
Cleveland.

And, alas, no sign of it coming either, Dr. Tayler.

Other low cost PET-compatible systems available

MEASUREMENT AND CONTROL INTERFACE

Plug your I/O interface gap – instantly – with the MC Computers PIP (Plant Interface Peripheral). Whatever your micro or mini computer, this universal input/output interface will perform anything from basic logging to comprehensive data acquisition and control – in the laboratory; under research conditions; or in industrial environments.

Start with the basic unit and use the range of plug-in option cards to let your PIP grow with your application needs.

- A mixture of analogue and digital input/output combinations can be accommodated.
- Upgradeable input/output capability with a range of plug-in cards.
- Universal computer interfacing through RS232C, IEEE 488 or RS422.
- Simple communications protocol.
- Easily programmed.
- Multidrop facility.
- Both "on-demand" and "automatic" operation.
- Stand-alone or rack-mountable peripheral.

PIP –plugs the I/O interface gap.

For further information contact:
MC Computers Limited, Park Street,
Newbury, Berkshire RG13 1EA, England.
Tel: Newbury (0635) 44967
Telex: 946643 MICRO G.

μC A member of the Micro Consultants Group

MC COMPUTERS

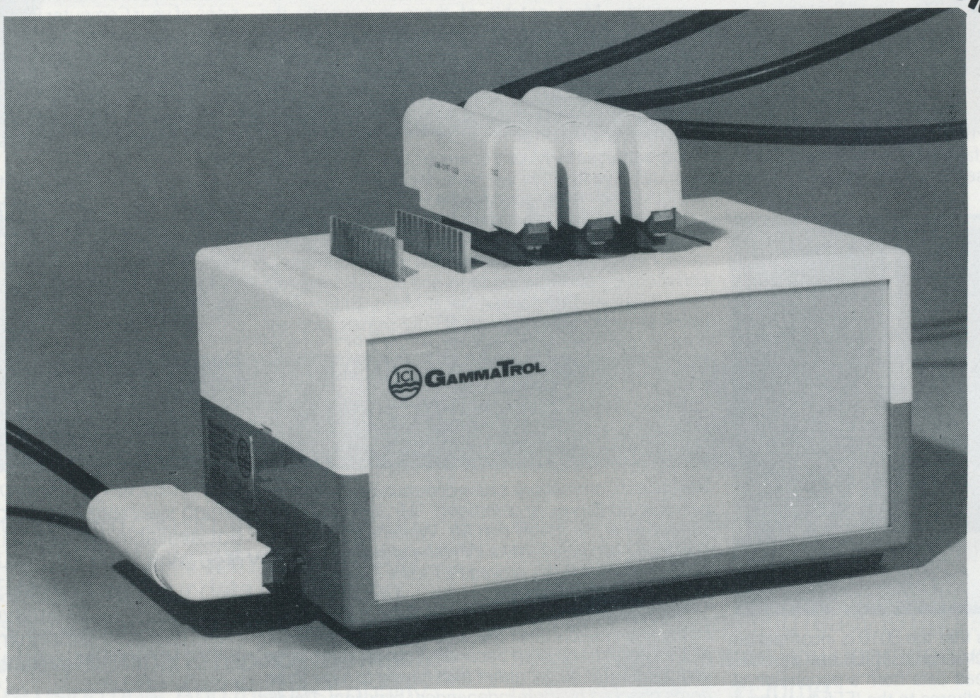
ICI

ICI GAMMATROL

OFFICIALLY APPROVED BY COMMODORE

WHAT WILL THE GAMMATROL BE DOING AT THE PET SHOW?

Making Tea. Come along and see it in action.



WHAT CAN THE GAMMATROL INTERFACE DO FOR YOU?

How about some of these .....

Laboratory Automation - Data Gathering
Chromatography - Plant Control & Monitoring
Automatic Test Equipment - Production Sequencing
Machine Control - Energy Management
Strain Measurement & Data Logging - Nucleonics
Even Counting - Spectral Analysis
Security Systems - Photographic Processing
Medical Monitoring - Analytical Instrumentation
Psychological Experiments - Animal Monitoring

and as a Teaching Aid in any of these fields.

HOW MUCH WILL IT COST YOU?

Decide for yourself - choose exactly the plug-in options you need, and no more.
If you've paid for a PET, you won't want to pay three times as much for an Interfacing System.
With the GammaTrol, you won't: the average price for a multi-function system is around £600.

FIND OUT MORE....

send your address to:

Petrochemicals & Plastics Division,
ICI Limited,
Physics & Radioisotope Services,
P.O. Box No.2,
BILLINGHAM,
Cleveland, England

or give us a ring on 0642-553601
Ext. 3752/2962/2727

WHAT WILL YOU NEED FOR IT?

Just sit it next to your PET, and plug it in. We give you free test and demonstration software, so you can have a working system within 10 minutes of delivery.

And when you come to write your own programs, you'll find simple pre-written BASIC instructions for using the GammaTrol in your manual.

WHAT DO WE DO FOR YOU?

Each unit comes with a comprehensive User Manual which tells you exactly how to wire up your equipment to the GammaTrol, via the connectors supplied. We'll calibrate the parts you order to your specification, standard or otherwise, and we'll still be around next year, when you decide to add to your system.

Choose from a comprehensive range of analogue and digital input and output options including counter and watchdog functions.

WHERE CAN YOU BUY ONE?

Direct from us a Billingham; or through any Commodore Dealer.
Either way it's guaranteed for a year.

COMMERCIAL SOFTWARE

for CBM/PET

Manufacturer £300
Supplied on PET disk. Suitable only for 32K PETs. A complete system to handle all the orders and invoices of a small factory, handles records of all customers and their orders, prints invoices, delivery notes and credit notes, keeps separate nominal analysis records for 10 departments, handles credit notes and unallocated cash, invoices for part delivery, complete audit trail and month-end update.

This is a complicated accountancy program. A free demonstration can be provided without any obligation.

Data and Invoice £50
keeps up-to-date records of customers' orders and issues invoices.

Stock Control £50
keeps detailed stock records and updates files.

Index Program £15
enables an author to assemble and sort an index for a book. The index can be saved on a cassette or disk between working sessions.

Addresses. £30
printed address labels and keeps an up-to-date file of business contacts, saves the list on disk or cassette and prints them out as required.

Textprocessor. £20
A modestly priced menu-driven word processor which allows format statements to be inserted in the text, automatic adjustment of left- and right-hand margins, and convenient simple editing with storage on disk or cassette.

Other standard packages are in preparation. Please telephone (0386) 831020 for information.

E~A Electronic Aids
(TEWKESBURY)

ELECTRONIC AIDS (TEWKESBURY)
MYTHE CREST, THE MYTHE,
TEWKESBURY, GLOS. GL20 6EB

TEL: (0386) 831020
OR: (0684) 294003

Standard and specialised programs for CBM/PET and other micros.

Machine-code programming for all applications of microprocessors in industry and for security systems.

Intex DATALOG LTD

INTEX DATALOG announce the 'PC-BASIC' BASIC compiler for the CBM range of microcomputers

- A program which has been SAVED normally on disk is compiled back onto disk into a directly loadable program file. The compiler is completely written in machine code and is fully compatible with CBM-Microsoft interpreted BASIC.
- It supports all BASIC commands and all CBM peripherals.
- The largest program that can be compiled is about 28K (depending on its structure).
- The increase in speed depends again on the type of program, but P.C.W. benchmark tests indicate that a compiled program will run at up to 10 times faster than its interpreted equivalent.
- Extra facilities available in a compiled program include:– 1) Integer loops for faster excution. 2) RUN/STOP disable/enable command. 3) Optional fully formatted listing of the program as it is compiled. 4) Optional production of a cross reference table of variables and line references at compilation. **FULL DETAILS ON REQUEST.**

ITEM	PRICE	TOTAL INC.VAT.
DUSTCOVERS		
PET – ALL MODELS	5.75	6.90
T/T43 PRINTER	5.75	6.90
ANADEX DP8000	3.50	4.35
CBM 3040 DISK (4040/8050)	3.50	4.35
CBM 3022 PRINTER	3.99	4.80
COMPUTHINK DISK	3.00	3.75
ACCOUSTIC COVER FOR CBM 3022 PRINTER	49.00	62.00
D/D DISKETTES IN FREE CASE		
BASF	35.00	40.83
VERBATIM	30.00	35.08
LIBRARY CASE	3.50	4.60
BLANK CASSETTES		
C15 (PER 10)	4.00	5.75
C60 (PER 10)	6.00	8.05
CONNECTORS		
USER/EEE PORT	1.30	1.78
CASSETTE PORT	.99	1.43
USER PORT COVER	2.50	3.16
MALE 'D' PLUGS	2.50	3.16
FEMALE 'D' SOCKETS	3.50	4.31
'D' CONNECTOR COVERS	2.50	3.16

ITEM	PRICE	TOTAL INC.VAT.
RIBBONS		
TELETYPE 43	7.72	9.17
ANADEX DP8000	2.75	3.45
ANADEX DP9500/1	15.00	18.40
CBM 3022	2.75	3.45
QUME (FABRIC)	4.25	5.18
QUME (CARBON M/S)	4.50	5.46
QUME(CARBON S/S)	5.00	6.04
DAISY WHEELS QUME SPRINT 5	6.50	7.76
PET ENNHANCEMENT UNIT		
INCLUDES REPEAT KEYS, KEY CLICK, RESET KEY, MUSIC FACILITY, FOR 3/4000 SERIES ONLY.	45.00	51.75
PROGRAMMERS TOOLKITS	15.00	17.25
PET DIGITIZER	10.00	11.50
REPEAT KEY	5.00	5.75
PETSET 1 A to D CONVERTER	99.00	113.85
TCM 100 PRINTER WITH APPLE INTERFACE (Ex Demo)	200.00	230.00
PAPER PRINTOUT TRAY		
FORMS RECEIVING TRAY (CBM 3022 - DP8000 - MICROTEK)	17.00	19.55

ITEM	PRICE	TOTAL INC. VAT.
COMPUTHINK EX. DEMO. DISK UNITS 3000 SERIES		
400K DISK DRIVES	695.00	799.25
800K DISK DRIVES	895.00	1029.25
APPLE SOFTWARE – ON DISKETTE		
25% OFF LIST PRICE + VAT.		

PLEASE ADD £1.00 POST & PACKING TO ANY ORDER
BOOKS & MANUALS VAT FREE.

MAIL ORDER SERVICE BY RETURN OF POST.

24HR. TELEPHONE ANSWERING SERVICE.

BARCLAYCARD – ACCESS FACILITIES.

BOOKS	PRICE
PET & THE IEEE 488 BUS	9.95
PROGRAMMING A MICRO 6502	7.25
A QUICK LOOK AT BASIC	8.95
TTL COOKBOOK	7.15
TTL EXPERIMENTS VOL 1	7.25
TTL EXPERIMENTS VOL 2	7.25
TV TYPEWRITER COOKBOOK	7.25
555 TIMER	5.35
PROGRAMMING THE 6502	8.75
6502 APPLICATION BOOK	8.75
ACCENT ON BASIC	4.95
ADVANCED BASIC	6.85
BASIC BASIC	6.75
BASIC COMPUTER GAMES	5.50
THE BASIC HANDBOOK	11.00
BASIC PRIMER	6.95
BASIC PRIMER	6.95
BASIC PROGS. FOR PET	10.95
6502 ASSEMBLY LANG. PROG.	10.50
PROGS. IN BASIC FOR ELECT ENG.	4.35
PROG. & INTERFACING THE 6502	8.95
PET LIBRARY OF SUBROUTINES	10.00
PET LIBRARY OF SUBROUT. DISK	11.50

MEMBER CRA COMPUTER RETAILERS ASSOCIATION

Barclaycard & Access Welcome	Showroom & Mail Order Departments	Commodore & Pet Software	Appleware & Nascom	Leasing, Hire Purchase, Short Time Hire, ask for written details	Books, Manuals, Accessories, Paper, Diskettes, Cassettes.

Eaglescliffe Ind. Est. Stockton
Cleveland TS16 0PN Tel(0642) 781193

Intex

HOTLINE

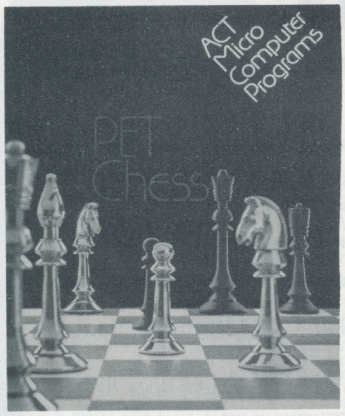
Hand-held PET Next Year

Commodore are working on a hand-held computer for release early next year. The new micro-PET will employ CMOS technology to reduce power consumption. Commodore already uses CMOS chips in its watches. "We will be converting all our N-channel 6502 chips to CMOS technology in the autumn", Jack Tramiel, the company's founder told *PRINTOUT*. Commodore are believed to be developing a special high resolution solid state screen for the hand-held computer.

Newcomer Challenges Microchess

PETChess, a new program developed by an International Chess Master, looks set to thrash the competition, including current best seller *Microchess*. The £14 program, to be released in July by ACT Microsoft, is the work of International Chess Master David Levy and PCW's Chess Editor, Kevin O'Connell.

Thirteen years ago Levy amazed the computer world by taking on all comers in a wager that no computer program would beat him within a decade. The lean and hungry looking Levy duly won his bet and started working on chess playing programs. The culmination is *PETChess*.



The program has a remarkably full specification with multiple levels of play, self-play mode which can be invoked at any time (useful when you are stuck), and an unusual Enter mode that allows the user to enter a series of moves by both sides. The player may also reject a move made by the program and ask it for its next best move.

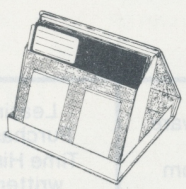
There is a Take Back feature that allows you to take back the last play. This can be done as often as you like, right back to the start of the game. Action Replay will rerun the whole game with variable gaps between moves. The graphics are excellent and special positions easily set up, enabling the user to get the program to solve chess problems or to start a game from any desired position.

The program will solve Mate-in-2 and Mate-in-3 problems and having found the solution, can be asked to search for an alternative solution. Printer owners can call up a printed games listing together with a printed diagram of the current board position.

Details from ACT Microsoft Ltd., Shenstone House, Dudley Road, Halesowen, West Midlands. Tel: 021-501 2284.

Disk Protection

Several nasty things happened to our word processing disks last month. The publisher sat on one (not too serious); the Editor poured coffee over another (messy); whilst a third ended up stapled to Gavin Sanders' pay cheque (a fate worse than death!). But it won't happen again. We are now using Reprodesign's plastic library cases which hold ten floppy disks. Most dealers can supply something similar, but we like Reprodesign's case because it is sturdy and at £2.45 plus VAT, good value. They also do transparent sleeves for filing diskettes in ring binders at £3.50 plus VAT for 10. Reprodesign are at 131 Market Street, Chorley, Lancs. Tel: 02572-78376.



PET Prestel Approved

The Post Office has given its approval to *The Bee*, a new gizmo that allows PETs and other microcomputers to retrieve and store information from the Prestel computer.

Thanks to the plethora of names -Prestel, Viewdata, Telextext, Ceefax, Oracle - most people, ourselves included, are more than a trifle confused by the various electronic services now available.

Teletext is the system by which the BBC and IBA transmit information coded into the normal TV signal. Anyone with a specially converted TV can receive several hundred screensful of information broadcast by the BBC's CEEFAX and ITV's ORACLE services. Content is mainly news, weather, sport and What's On?

A much more comprehensive service is offered by the Post Office's Prestel System. Until now subscribers had to rent or buy a special TV set and keypad with which to access, via the telephone, more than 150,000 pages of mainly business information held in a database.

To date Prestel has not been a notable success. Apart from the Post Office's usual hamfisted approach to marketing, the cost was high, separate charges being levied by the Post Office for connection time and by the information provider. On top of this comes the cost of the telephone call.

Now Bolton-based PET dealers, B&B Computers have received Post Office approval for a Prestel adaptor that allows anyone with a standard domestic television and a PET (or other computer with IEEE or RS232C) to access the system. *The Bee* is a self-contained unit with a built-in telephone modem and autodialler. Prestel pages are accessed with a retrieve command but are then stored in the PETs random access memory and can be saved on disk or cassette, or sent to a printer for hard copy. This means that a page of Prestel can be used as often as you like but that you only pay for it once. No further telephone, computer or page charges.

The Bee costs £575 plus VAT. Details form B&B Computers, 124 Newport Street, Bolton, Lancs. Tel: 0204-26644.

Graphics Vigil

Considering how good PET's graphics are it is surprising how seldom you see them put to good use in a program. Part of the problem may be that whilst sixty four (128 if you include reverse field) special graphic characters are provided, the PET lacks built-in graphic handling functions.

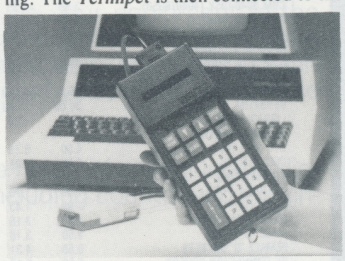
Recognizing the need, Arnie Lee of Stateside software house, Abacus, has developed a new interactive language called *VIGIL*. He claims it is an acronym for Video Interface Game Interpretive Language, although we are prepared to bet he thought of the name first. It is an easy-to-learn graphics and game language that lets you quickly create interactive applications.

There are more than sixty commands for manipulating graphics figures on the screen, plus double density graphics, giving 80x50 plot positions on the 40 column PET/CBM. Other features include tone generation - if you have an external speaker - and access to two event timers. *VIGIL* is available on cassette for any small screen PET at $40 (£19 approx) including postage from Abacus Software, P.O. Box 7211, Grand Rapids, Michigan 49510. Access/Eurocard + Barclaycard/Visa accepted.

Hand-held Data Processing

The arrival of the hand-held data terminal is making a big difference to the lives of those whose jobs include the recording of large amounts of data. If you have ever been involved in stock taking or statistical analysis, you will know what we mean. If not, take our word for it.

Termipet is a hand-held data capture terminal that can be used remote from the PET. Data, on stock for example, is entered via the little keyboard or by wand scanning of bar codes printed on the product packaging. The *Termipet* is then connected to the computer via a special interface developed by Mektronic Consultants of Manchester. The stored data is then transferred straight into PET's memory for storage on disk or cassette, or immediate processing.



The *Termipet* holds 4K of data which can be transferred to PET in less than 3 minutes. 8K and 16K RAM versions are available. Prices start at £795 + VAT. Details from Catlands Information Systems Ltd., Harrison Building, Green Lane, Wilmslow, Cheshire or Mektronic Consultants, 116 Rectory Lane, Prestwich, Manchester.

Software Saves Millions

A PET-based software system is saving a mining company more than £2.3m a year in maintenance costs. The system, which has been developed by a small Wiltshire company is *Mainopt*, short for Maintenance Optimization. Engineers who have seen it believe it may be the biggest breakthrough ever in maintenance engineering.

Mainopt tackles one area only: what is worth doing, and if it is worth doing, then at what interval? A planned maintenance system can never be better than the decisions it incorporates. Those decisions up to now have been made by a process described variously as seat-of-the-pants, and engineering judgement. The first part of the decision is to determine the information upon which the decision is to be based. One is always short of information, but it is a reasonable axiom that decisions should be based on the best information possible.

The second half of the process is to use that information to make the decision. This is not a matter of judgement - it is a commercial calculation. Needless to say the mathematics are foul, and until the advent of the silicon chip, the calculation has rightly been considered to be totally intractible.

"*Mainopt* has an enormous credibility problem," says its developer, Wing Commander Colin Labouchere. "If we were offering a system that could pay for itself in twelve months, people might believe us. If we offer a system that can pay for itself in twelve weeks, they ask what the catch is."

So what exactly is *Mainopt*? Labouchere describes it as the complete know-how and wherewithall to move from wet finger maintenance (and he is not being rude) to numerate maintenance. The £14,000 price tag includes the software, necessary PET hardware and training. Details from C.M.(Mainopt) Ltd., Kington St. Michael, Chippenham, Wiltshire. Tel: 024975 222.

Programs for Teacher

We are often asked for advice on where to find educational software. The sad truth is that in this field too there are many excellent individual programs - and lots of truly dreadful ones. Notable by their absence have been a series of well executed *courses* in different subjects.

In the United States this is an area that *Microphys Programs* of Brooklyn, New York, have made their own. There are three types of programs in their series: computer assisted instruction programs which guide the student through a series of quantative questions, evaluating his responses and giving assistance when needed; individualised instruction programs that generate a unique set of problems for each student; and utility programs designed to provide solutions to time consuming problems, often given as part of homework.

Microphys have a very wide range covering Physics, Chemistry, Calculus, Mathematics, Vocabulary and Spelling. A catalogue is available from them at 2048 Ford Street, Brooklyn, New York 11229, U.S.A. Tel: (212) 646 0140.

Software Brief

More Free Software!

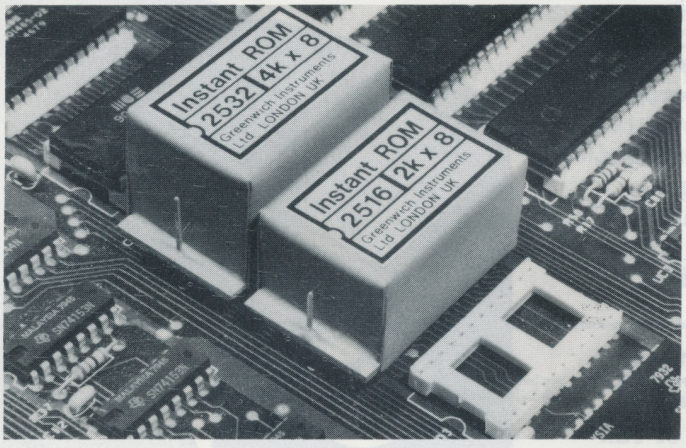
Commodore are offering the *Pascal* and *LISP* languages plus their *Assembler Development Package* free of charge to educational purchasers of a 4032 or 4040 disk unit. The offer covers purchases made between April and June this year. The company are already distributing free copies of *COMAL* structured BASIC and 108 other programs - including one entitled DRUNKARD and another called Smog Simulation - through the medium of their educational software workshops. Over 300 have been held so far.

Pascal is the language favoured by most computer scientists as a first 'serious' programming language, on account of its structured programming techniques. Commodore's description of *LISP* as "the FORTRAN of Artificial Intelligence" is true if you happen to be familiar with FORTRAN. We will settle for saying that *LISP* is not an easy language to master, but if you are into Robots, you will be needing it.

The *Assembler Development Package* is a means of programming the PET in machine code. You type in the mnemonics of 6500 assembly language and the Assembler produces pure machine code.

Details from Nick Green at Commodore Systems, 818 Leigh Road, Trading Estate, Slough. Tel: 0753-74111.

Instant ROMs!



Have we ever wanted to write programs that would stay in PET permanently, asks Mr J.S. Blackburn of Greenwich Instruments. Have we ever wanted to extend BASIC, write security programs, special print routines? Yes, Mr Blackburn, we have, often. But not having an EPROM programmer concealed about our person, we never quite got around to it.

Mr Blackburn, as you may have guessed, has something up his sleeve. An *Instant ROM* no less. In case you are wondering, that is a 2K -or 4K - CMOS memory chip with battery back up. Plug it into the PET and write your program into it just as if it were RAM. Or load programs from tape, disk or some other part of memory. Then remove the Write Enable lead and your program is there permanently -for years! Even when you switch the power off. Programs can be edited or altered immediately yet the program is permanent.

Several applications spring immediately to mind including custom character fonts, screen handling routines we use regularly, and an improved machine language monitor. Any of them easily accessible with a SYS command.

How much? £39 plus VAT for the 2K *Instant ROM*; £56 for the 4K device from Greenwich Instruments Ltd., 22 Bardsley Lane, Greenwich, London S.E.10. Tel: 01-853 0868.

Moves

Dataview, the Wordcraft people, have decamped to Portreeves House, East Bay, Colchester. Tel: 0206-865835.

The Commodore "Information" Centre has closed shop; the premises have been taken over by Sumlock Bondain.

Compiled Again!

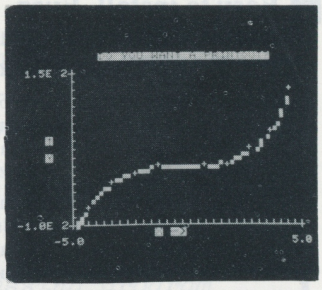
We were just congratulating ourselves on the thoroughness of our news report on BASIC Compilers in the last issue when word of another one reached us. Intex Datalog's new *PC-BASIC Compiler* takes a program which has been normally saved on disk and compiles it back onto disk as a directly loadable program file. The attraction is that the compiled program will run much faster than one interpreted from BASIC into machine code line-by-line in the normal way. Some types of program will run ten times faster when compiled, although an increase in speed of the order of two-and-a-half times would be more usual. Compilers have several disadvantages, which is why the PET and most microcomputers are supplied with a resident BASIC interpreter instead. We will be examining the pros and cons and comparing the products available in next months issue.

The *PC-BASIC Compiler* (no, we don't know what P.C. stands for) is written entirely in machine code and is said to be fully compatible with PET's interpreted BASIC. All BASIC 2.0 commands and Commodore peripherals are supported. A BASIC 4.0 version for SuperPETs and 4000 series machines will be available from the end of September.

The price is £300 plus VAT. Full details from Intex Datalog Ltd., Eaglescliff Industrial Estate, Stockton-on-Tees, Cleveland. Tel: 0642-781193. Watch out for full test reports and a guide to BASIC compilers next issue.

Scientific Software

Although the PET is more widely used in the laboratory and in industry than any other microcomputer, good technical and scientific software is still hard to come by commercially. The release of the *Tecpacs* range of programs by the Technical Software Centre is therefore welcome.



Areas covered include statistical data analysis, function evaluation and plotting, mechanical engineering control theory and structural analysis. The *Tecpacs* are Commodore approved with prices from £80. A glossy colour brochure is available from the Technical Software Centre, BHRA Fluid Engineering, Cranfield, Bedford. Tel: 0234-750102.

WAGES AND SALARIES

Is the payout costing you more than it should?

SUPERPAY and BASICPAY — two payroll systems from Computastore to cut the cost of payroll, whatever the size of your company.

Over the past two years Computastore Payroll systems have proved their effectiveness for over 300 companies — ranging in size from six employees to over a thousand.

Suitable for *all* types of PET and CBM Disk, Computastore's SUPERPAY and BASICPAY are the only Payroll Programs approved by Commodore.

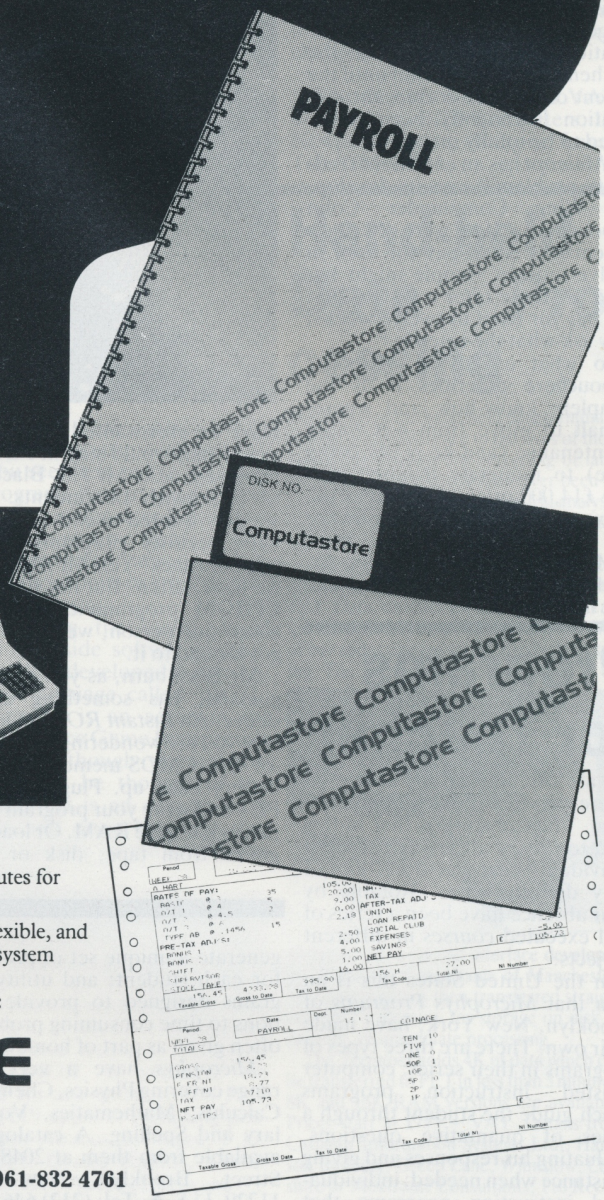
SUPERPAY £350

- **Easy to read departmental analysis with up to 20 rates of pay and adjustments, for up to 26 departments.**
- **Automatic printing of year end P60's, P11's and P35's.**
- **Automatic printing of credit transfers.**
- **Automatic increase of all tax codes for budget changes.**
- **Net Pay Rounding to any amount less than £10.**
- **PLUS all of BASICPAY's standard features.**

BASICPAY £75

- **Automatic calculation of Tax and NI for weekly, monthly, four weekly, or irregular payment periods.**
- **Automatic advancement of tax week for holiday periods.**
- **Automatic coin analysis for cash payments.**
- **Can produce individual payslips.**
- **Option to process all employee payslips automatically.**
- **Easy to install. Even newcomers to computers can use BASICPAY within a few hours.**

COMMODORE APPROVED



Each program takes no more than 35 seconds per employee for build up to gross, net pay calculation, and printing a payslip in duplicate.

That works out at only 2 hours each week for a typical payroll of 200, or just 15 minutes for a staff of 20.

SUPERPAY is designed for medium size companies which need a comprehensive, flexible, and easy to use payroll; BASICPAY is for small companies who want a flexible, low cost system which carries Commodore's seal of approval.

For the name of your local Computastore Agent, contact:

Computastore

Computastore

Computing for Business

Computastore Ltd., 16 John Dalton St., Manchester M2 6HG. Tel: 061-832 4761

THE SCULLION

THE CONTROL LINK FOR YOUR PET OR AIM 65.

The Commodore PET Desk-Top Computer (and Rockwell AIM 65) can now talk to the outside world via the SCULLION.

This versatile unit plugs into the user port and can:-
Switch mains units on and off,
vary the power supplied

Control many different switch on,
power up, power down and switch off cycles.

6 mains output sockets are provided, each with a 10A capability.
2 switch inputs are also provided.

Cost £185 + P&P (£2) + VAT.

Also available:-
The very popular **COMMUNICATOR** £79 + P&P (£2) + VAT
and in kit form - **COMMUNIKIT** £49 + P&P (£2) + VAT

The **COMMANDER** - a powerful PET interface unit with 32 I/O expandable up to 128 I/O. from £850 + P&P (£2) + VAT.

The **TERMIPET** - remote data collection, barcode system. from £795 +P&P (£2) + VAT.

MEKTRONIC CONSULTANTS,
SPECIALIST ELECTRONIC DESIGNS
116 Rectory Lane, Prestwich, Manchester M25 5DB
Telephone 061-798 0803 Telex 666387 Attn.MEKTRONIC

For further information: A list of the Top 20 uses of the Communicator are available on request FREE.

HOW TO BUY A PAYROLL PROGRAM

First, go to your CBM/PET dealer and ask to see at least two different payrolls.

Second, make sure that one of those you see is the LANDSOFT 'PAYROLL PLUS'.

We are serious when we say that you should see more than one. Only that way are you sure to find one that is most suited to your individual needs. However good PAYROLL PLUS is, there are certain things it won't do that other payrolls will — and vice versa.

Why do we say that you should insist that PAYROLL PLUS is among those demonstrated to you? Because it is so elegant in operation and so extremely easy to use that this tends to belie its complexity. If you want a payroll that needs an expert to operate it, or if you enjoy spending hours trying to decipher an operating manual then PAYROLL PLUS is definitely NOT for you. You would find it too quick and easy to master.

So don't make the mistake of buying another and then seeing PAYROLL PLUS afterwards. Your awareness of its excellence could then be most frustrating!

Some 400 Landsler payrolls have been sold and many are in use by accountants and even bureaux.

For 32K CBM/PET 3000/4000 & 8000 series **£150 plus VAT**

LANDSLER SOFTWARE 29a Tolworth Park Road, Surbiton, Surrey. Tel: 399 2476

*STOP PRESS ! Announcing a remarkable machine code Word Processing program called **WORDFORM**. It will do all that most users require of a word processor. A truly amazing program at an amazing price!*
**** Disk or Cassette only £75+VAT ****

SUPERIOR PROGRAMS FOR THE CMB/PET MICROCOMPUTER

Personal Electronic Transactions

The PET Clock

The PET has two "reserved variables," TI and TI$ which are used for keeping the time. TI is a floating point variable which counts the number of ticks, or "jiffies" since the PET was turned on (or the time reset). A "jiffy" is 1/60 of a second.

TI$ is a 6 character string that holds the time in the format HHMMSS (Hours, Minutes, Seconds) on a 24-hour clock. TI$ can be assigned a new value to reset the PET's clock.

The PET's clock runs from the 60 hz interrupt that takes care of various "housekeeping" functions such as scanning the keyboard and updating the clock. Though the interrupt processing takes about 10% of the PET's time, the other 90% is available to you—and for most uses, the PET's interrupt is never seen. Let's move on to some examples with the PET's clock.

Turn on your PET and enter: PRINT TI,TI$. You will see something like: 2071 000034. The PET has been on (in this case—your number will likely differ) for 2071 "jiffies," or 34 seconds. Jiffies can be converted to seconds by dividing by 60. Try: PRINT TI/60, TI$. I got: 184.183333 000304 and indeed 184 seconds is 3 minutes and 4 seconds.

The next experiment is to try resetting the clock. If you try: TI=1234, you will see ?SYNTAX ERROR—the PET will not permit the direct setting of TI. However, TI$ is more amenable. Enter: TI$="010101": PRINT TI$ and 010101 will appear—the PET's clock has been set to the new time.

I will leave it to you to verify that TI$ will only accept a 6 character string of numerals only. You will get an ?ILLEGAL QUANTITY ERROR for your incorrect attempts. TI$ is remarkably tolerant of other inputs, provided they are numbers. For example, the entry 303030 will result in the clock being set to 000000. Here is a small program for exploring this behavior:

```
10 INPUT"TIME HHMMSS";TI$
20 A$=TI$
30 PRINT A$
40 IF A$=TI$ THEN 40
50 GOTO 20
```

This program accepts a value for TI$ and immediately prints it. Then idles until TI$ is seen to change, and the time is re-displayed. The result is something like:

```
RUN
TIME HHMMSS? 102030
102030
102031
102032
etc....
```

If values beyond 24 hours, or minutes past 60, etc. are entered, TI$ behaves reasonably. Here are some examples:

```
TIME HHMMSS? 000099
000139
000140
TIME HHMMSS? 300000
300000
000000
000001
```

Some experimentation will result in: 1) Times over 60 in seconds, or minutes, will be corrected to the right time—for example, 99 seconds becomes 1 minute 39 seconds. 2) Times over 24 hours will be reset to 000000 unless the value is over 774021. Higher values behave as if 774021 were subtracted first—try 999999 and see!

Further experimentation reveals that the 24 hour roll-over is a bit peculiar:

```
TIME HHMMSS? 235958
235958
235959
240000
000000
000001
```

At 24 hours, *both* numbers suddenly appear! (without the 1 second delay between them.) Those of you trying to make timers for more than 24 hours take note— the test should be for 000000, not 240000.

You might have noticed that the first value entered remains until 1 second has passed—this brings out two details of the PET TI$ function. First, when TI$ is assigned a new value, the string TI$ is converted to the jiffies value— and then the jiffies value is used to generate TI$. This explains what happens with 99 seconds, etc. Second, the jiffies counter can hold a maximum time of 774021, and is checked each second for a value over 235959. When this condition is detected, the clock is reset to zero. Until the second ticks past, TI$ will be whatever it was assigned by BASIC.

For most practical uses it suffices to keep the time within 24 hours and the PET's clock will work just fine.

Some dedicated souls have checked the PET's clock for accuracy—the truth is that the PET clock isn't very good. The values vary, but the PET will gain about 4.3 seconds/hour when running a program, and lose 1.2 seconds per hour when idling. The reasons why are unknown!

The applications of the time function are endless—here is a quickie "reflex-checker" as an example:

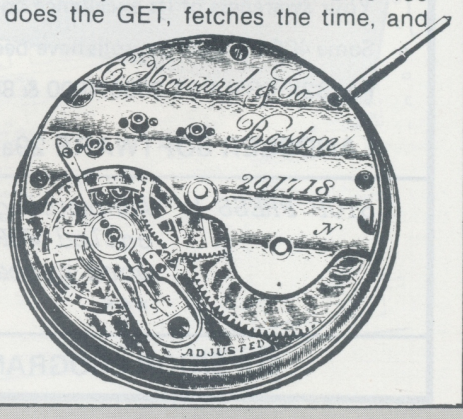
```
10  PRINT" clr REFLEXO!!!"
20  PRINT" dn dn WHEN YOU SEE A
    DOT, PRESS"
30  PRINT" A KEY AS SOON AS
    YOU CAN!!!
35  FOR J=1 TO 2000: NEXT J
40  C=81: REM POKE FOR SHIFT-Q
50  P=32768+1000*RND(1)
60  REM CLR SCREEN & WAIT
    RANDOM TIME
70  PRINT"clr";
80  TA=TI
90  TB=300*RND(1)+120
100 IF TI<TA+TB THEN 100
110 REM ELIMINATE ANY KEYS IN
    BUFFER
120 GET A$: IF A$ <> "" THEN 120
130 REM NOW DRAW DOT
140 POKE P,C: TA=TI
150 GET A$: TB=TI: IFA$="" THEN 150
160 PRINT"TIME WAS:"(TB-TA)/60"SEC"
170 GOTO 20
```

Try it out and see—my best time was .23 seconds (if I didn't cheat by banging the space key a lot). There are several details worth noting: Line 35 is a delay loop of the "first kind" (i.e., keep the PET busy doing something useless for a while). Lines 40, 50 and 140 depend on the fact that the PET's display is the 1K bytes starting at the 32K boundary. Address 32768 is the "home" position on the screen. This puts a *Q* randomly on the screen to make the game harder to do.

Lines 80 through 100 are a delay loop of the "second kind" where the PET's TI is used to measure the time interval. In this case, the interval ranges from 2 to 7 seconds. (My first version didn't have the extra 120 jiffies— and the fast ones were hard to do.) This kind of delay loop can be quite useful for many things.

Line 120 prevents cheating—recall the PET will store up to 10 keystrokes before BASIC asks for them. If you remove Line 120, and press a key before the dot appears, you can get a 1-jiffy reflex time which is meaningless.

Line 140 draws the dot, and immediately fetches the time. Line 150 does the GET, fetches the time, and



then checks for a character. I hope the delay is about the same for both lines (As I recall from biology, a .23 sec reflex time is pretty good.)

If your PET is "wired for sound" (see previous columns on music), a clock with chimes can be built. Most PET owners should have the BIGTIME program by now (Contact Commodore if you don't), and a good project to learn about time is to add chimes and an alarm feature. Skilled programmers can contend with correcting the PET's time gain by resetting TI$.

A Bit of Relaxation

Here's one for you to figure out (if you can!). Clear the screen and enter the following characters (exactly!):

hm L @ rvs @ cr
(Home, shift L, @, RVS, @, RETURN)

and then: SYS 32768.

Now, press some keys and see what happens.

For some variations, add the character rvs * (reverse shifted asterisk) before the L @ rvs @ combination. For example,

(reset your PET)
clr hm rvs * * * * off L @ rvs @ cr
SYS 32768

You can add as many rvs * as you want in front. ■

by Gregory Yob

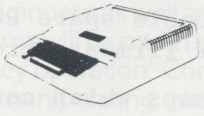
Copyright 1980 Creative Computing 51 Dumont Place, Morristown, New Jersey, 07960, USA.

PET & APPLE II USERS

TINY PASCAL

Plus+

GRAPHICS



The TINY Pascal System turns your APPLE II micro into a 16-bit P-machine. You too can learn the language that is slated to become the successor to BASIC. TINY Pascal offers the following:

- **LINE EDITOR to create, modify and maintain source**
- **COMPILER to produce P-code, the assembly langauage of the P-machine**
- **INTERPRETER to execute the compiled P-code (has TRACE)**
- **Structured programmed constructs: CASE-OF-ELSE, WHILE-DO, IF-THEN-ELSE, REPEAT-UNTIL, FOR-TO/DOWNTO-DO, BEGIN-END, MEM, CONST, VAR ARRAY**

Our new TINY Pascal PLUS+ provides graphics and other builtin functions: GRAPHICS, PLOT, POINT, TEXT, INKEY, ABS AND SQR. The PET version supports double density plotting on 40 column screen giving 80 x 50 plot positions. The APPLE II version supports LORES and for ROM APPLESOFT owners the HIRES graphics plus other features with: COLOR, HGRAPHICS, HCOLOR, HPLOT, PDL and TONE. For those who do not require graphics capabilities, you may still order our original Tiny Pascal package.

PET BASIC 4.0 version available February 1981

TINY Pascal Plus+ GRAPHICS VERSION-includes manual

PET 32K NEW Roms cassette	$65
PET 32K NEW Roms diskette	$60
APPLE II w/ROM Applesoft only w/DOS	$60

TINY Pascal NON-GRAPHICS VERSIONS-includes manual

PET 16K/32K NEW Roms cassette	$50
PET 16K/32K NEW Roms diskette	$45
APPLE II w/ROM Applesoft 32K w/DOS	$45
APPLE II w/RAM Applesoft 48K w/DOS	$45
USER's Manual (refundable with software order)	$12
6502 Assembly Listing of INTERPRETER-graphics	$30
non-graphics	$25

Includes Airmail Postage to Europe. Orders may be prepaid of by bankcard (include card number and expiration date) Eurocard, Access, Barclaycard, etc

ABACUS SOFTWARE
P. O. Box 7211
Grand Rapids, Michigan 49510 USA

Convert your PET to a terminal for £180!

Why spend £4000 on a terminal when you can convert your Commodore PET for only £180 to do exactly the same thing? Kingston offer you this with NETKIT – a hardware/firmware package which dramatically widens the scope of the PET, and maintains Kingston's reputation as market leaders in computer communications and interfaces.

- **Netkit allows the PET to link to any RS232 Device,** including another PET, micro, most mini and main frame computers.
- **Easy to use,** no complicated machine code for input.
- **Gives automatic character conversion.**

Useful in programming and linking to paper tape punches, instrumentation and control devices.

- **Can be used as a normal printer interface.**
- **High speed transmission via RS232** and not IEEE.
- **Detailed manual, cable connections and supporting software also included.**

Hundreds of NETKITS have well documented operational reliability in numerous applications. Find out more for yourself, just send for further information on NETKIT and other Kingston products: Once you've seen our leaflet you may wish to take up our 30 day sale or return offer. **We are sure you'll be convinced.**

KINGSTON

Kingston Computers Limited, Electricity Buildings, Filey, Yorkshire, U.K.
Telephone: 0723 514141 Telex: 52163

PETALECT
MICROCOMPUTERS

£365+V.A.T.
PETALECT, already one of the most successful micro-computer retailers, now require the following to spearhead expansion into the microcomputer market:

Microcomputer Showroom Managers
Microcomputer Sales Persons
(For North London, South London, South East England)

Ideally, applicants should have micro/mini computer experience and a general knowledge of business systems. Sales Managers should have a proven sales record, but we will train suitable Sales Persons.

We can offer a secure future together with an attractive salary and conditions in an expanding company.

Petalect Electronic Services Limited
Showroom: 32 Chertsey Road, Woking, Surrey GU21 5BG Tel: Woking 63901/68497
Head Office: 33/35 Portugal Rd, Woking, Surrey GU21 5JE Tel: Woking 69032/21776

Old tricks for new Pets...

COMMAND-O is a FOUR KILOBYTE Rom for the 4000/8000 Basic 4 Pets with all the "Toolkit" commands RENUMBER (improved), AUTO, DUMP, DELETE, FIND (improved), HELP, TRACE (improved & includes STEP), and OFF - plus PRINT USING - plus four extra disk commands INITIALIZE, MERGE, EXECUTE, and SEND - plus extra editing commands SCROLL, MOVE, OUT, BEEP, and KILL - plus SET user-definable soft key, 190 characters - plus program scroll up and down - plus 8032 control characters on key. Ask for Model CO-80N for the 8032 or CO-40N for the 4016/4032. £50.00 plus Vat

New tricks for old Pets...

DISK-O-PRO is a FOUR KILOBYTE Rom that upgrades 2000/3000 Pets, but lets you keep all your old software - including Toolkit. As well as REPEAT KEYS and PRINT USING, you get all the Basic 4 disk commands CONCAT, DOPEN, DCLOSE, RECORD, HEADER, COLLECT, BACKUP, COPY, APPEND, DSAVE, DLOAD, CATALOG, RENAME, SCRATCH and DIRECTORY - plus extra disk commands INITIALIZE, MERGE, EXECUTE and SEND - plus extra editing commands SCROLL, MOVE, OUT, BEEP and KILL - plus SET user definable soft-key, 80 characters - plus program scroll-up and scroll-down. We recommend the 4040 disk or upgraded 3040 for full benefit of disk commands. Ask for Model DOP-16N for new Pets 2001-3032, and 2001-8 with retrofit Roms & TK160P Toolkit. £50.00 plus Vat, other models available.

PRONTO-PET hard/soft reset switch for the 3000/4000 Pets. We don't think you'll "crash" your Pet using our software, but if you do the Pronto-Pet will get you out! Also clears the Pet for the next job, without that nasty off/on power surge. £9.99 + Vat

and no tricks missed!

KRAM Keyed Random Access Method. Kid your Pet it's an IBM! VSAM disk handling for 3032/4032/8032 Pets with 3040/4040/8050 disks means you retrieve your data FAST, by NAME - no tracks, sectors or blocks to worry about. Over 2,500 users worldwide have joined the "Klub"! Now you can too, at the 1981 price, £75.00 plus Vat.

SPACEMAKER All our Rom products are compatible with each other, but should you want, say, Wordpro with Kram, or Disk-o-pro with Visicalc, then SPACEMAKER will allow both Roms to address one Rom socket, with just the flip of a switch, for £22.50 plus Vat.

We are sole UK distributors for all these fine products. If your CBM dealer is out of stock, they are available by mail from us, by cheque/Access/Barclaycard (UK post paid) or send for details.

Calco Software

Lakeside House Kingston Hill Surrey KT27QT Tel 01-546-7256

ROM-X

Unlike other plug-in chips for the large keyboard PET this latest development from SUPERSOFT doesn't take up one of your valuable spare ROM sockets! That makes it compatible with just about every other firmware product.

How does it work? ROM-X replaces one of the chips which came with the machine, the one in the UD8 socket. By rewriting the routines in this ROM we've been able to add many valuable features - but the major entry points are unaltered so that programs in machine code like MICROCHESS and INVADERS will still run!

HERE'S A SUMMARY OF THE MAIN FEATURES....

* AUTO-REPEAT ON ALL KEYS * ESCAPE KEY * USER-DEFINABLE KEY
* FASTER DISPLAY * MORE ACCURATE CLOCK * 'LUKEWARM' START
* KEY-AHEAD PROTECTION * OPTIONAL SCROLL PAUSE

ROM-X is there when you switch on. No SYS commands to remember! Operation of cassettes and disks is totally unaffected - ROM-X does not use ANY locations in the first or second cassette buffers!

ROM-X IS AVAILABLE NOW FOR NEW ROM MACHINES - JUST £29 PLUS VAT !

1981 Catalogue available FREE

VERBATIM DISKS £18 FOR TEN
DOUBLE DENSITY (8050) £25
DOUBLE SIDED (COMPUTHINK) £29

U.K. customers please add 15% VAT

SUPERSOFT

28 Burwood Avenue, Pinner, Middlesex
Phone 01-866 3326

ALL PREPAID ORDERS POST FREE IN U.K.

JOHN NUTTALL dons pinstripes to meet JCL's Business ROM

If you read the erudite review of the JCL Turnkey ROM in the February/March issue of *PRINTOUT* by Terry Hope, you will be interested in a development of this ROM now termed the Business ROM.

Whilst it has most of the features of the old Turnkey ROM, and a few others to boot, it has the new and useful change to its implementation. No longer are all the functions called by SYS.... (I can never remember the things) but rather by proper keywords. There are two ROMs in this set; one replaces a CBM chip at $E000 and the other sits at $9000. On power-up the PET will jump straight to these utilities and the screen will invite you to press the space bar twice to load up the first program from disk. If the first program is DOS support or Wedge, there isn't much point loading it in, as the JCL ROM already contains a corrected DOS support. Pressing RETURN at this stage will put you in the READY mode.

The chips are suitable for BASIC 2 or BASIC 4 (40 or 80 columns), although some features will not work with the older BASIC 2.

Features

There's no doubt in my mind about the amount of thought that has gone into these enhancements of BASIC. And they work very well indeed. Let's see what's on offer:-

UPPER-LOWER switch case options: available direct or from program i.e. 400 UPPER

REPON/REPOFF software repeat for all keys, available direct or from program i.e. 200 REPON

STOPON/STOPOFF disables (or enables) STOP key without affecting TI$. available direct or from program, i.e. 10 STOPOFF

DELAY programmed delay between 1 and 32768 milliseconds. May be used direct or in program e.g. 300 DELAY (3000): REM delays for 3 seconds. Saves having to use FOR...NEXT loops

PRINT at again available direct or from program. Format is PRINT (H,V) J, where the variable J will be printed at coordinate H (horizontal position) and V (vertical). Several PRINT statements can be cascaded by using ":"

RESPOND provides a string input routine with limited response length (N). Edit functions limited to DEL key, i.e. 255 RESPOND (R$,12). Can be limited to numbers by putting a hash last in prompt line, or letters with a shifted space.

CASH IN input routine designed for cash input. The number of characters preceeding the numeric field, the number of numbers in the numeric field prior to the decimal point and the number of characters after the decimal point can all be defined. Separate string variables receive alpha and numeric fields, the latter being concatenated without the decimal point and padded with leading and trailing zeros. Can only be used under program control.

```
600 CASHIN 2,5,2,A$,N$ : REM AA NNNNN.NN
```

GETKEY waits for a single key to be pressed and then assigns that key to variable defined. Key may be limited to single or group. May only be used within program, i.e.

```
250 GETKEY A$,"YN" : REM ALLOWS ONLY Y or N.
```

SCREENSAVE/GETSCREEN/EXCHANGESCREEN/DUMPSCREEN SAVESCRN (N) will transfer the present screen display to a reserved area at top of memory for later recall with GETSCRN command. EXSCRN (N) will transfer present screen to reserved area and transfer that area to screen. DUMPSCRN will transfer present screen to CBM printer, upper and lower case and graphics printed as they appear on screen. May be used direct or in program mode.

MEMSAVE/RELOAD MEMSAVE provides means of recording a specified area of memory as a named file on disk for later recall by RELOAD. Use direct or via program, e.g.

```
300 MEMSAVE "0:2ND BUFFER",8,826,886
```

Note after RELOAD BASIC points are not disturbed and program will continue with next statement.

DISK disk directory display with option of specifying file type. Prior to using, channel must be opened for reading directory.

```
10 OPEN 1,8,0,"$0:*-S": REM SEQUENTIAL ONLY
20 DISK
30 CLOSE 1
```

PRINT LIST lists BASIC programs to CBM printer, direct or under program control. (Don't have to OPEN 4,4 etc.) e.g. PLIST or PLIST 255-900

SKETCH Allows a sketch or design or print to be made up on screen with full use of all keys, including EDIT. Screen roll inhibited. Direct or programmed use. Leave sketch mode with shifted RETURN.

```
100 "Clr screen"
200 SKETCH
300 DUMPSCRN: REM produce hard copy
400 REM is this world's shortest Word processor?
```

In addition to these routines, there are a number that are associated with the JCL screen input system (SCRINP for short). These are designed to assist in the input of data and provide a high degree of reliability. It becomes almost impossible for programs to crash out or for users of the non-computing variety to type in meaningless data.

continued on page 59

MORE POWER FOR YOUR PET™.....!!

Business ROM: Simply plug 'Business ROM' into your CBM/PET™ microcomputer, and gain over 25 new BASIC commands — designed to make the PET easier to use, and more powerful, for business use. Beginners as well as experienced software houses will welcome this professional tool. Your programs will be much shorter, more reliable, run faster, be easier to use, etc. Features include:– Turnkey operation; Completely foolproof input routines; Disk handling made simple; Superb screen manipulating, (send screens full of information to memory or disk or printer with single word command); and many more. All these machine code routines are available all the time PET™ is switched on; and they are called by properly tokenised keywords. Price £120 plus VAT. Extensive User Manual available separately for £2.50 (allowable against subsequent purchase). Send for free leaflet giving full details of this exciting new ROM.

BUSINESS ROM REALLY DOES MEAN BUSINESS!!

ROM Pager: A small board that fits neatly inside your PET™, and allows up to 8 different ROMs or EPROMS to be plugged in at one time. Fitted in seconds (it just plugs in), it is fully software controlled — you can even change ROMs from within a program! Now you can have VISICALC, Business ROM, WORDPRO, etc, all plugged in at once. £45 plus VAT.

EPROM Programmer: The programmer that has all the tools of a development system. Allows all common types of EPROM to be programmed. The Programmer's Programmer! £250 plus VAT.

Text Processor: Using the power of the Business ROM means we can offer this fast, easy-to-use Text Processor for only £100 plus VAT. It gives you all the facilities to write and edit text of any type; extract and join files; etc. Reprodesign use this program in a PET™ linked to a phototypesetter to produce artwork like this advert!!! They could do the same for you.

Other PET™ products: Floppy Disks, Continuous stationery (plain or printed to your details), Some top-quality American Software (eg VISICALC at £98 plus VAT), etc. Send for free catalogue. All software is Post Free.

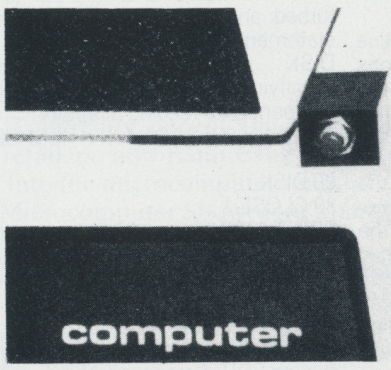
Demonstrations/more information/advice/etc given with pleasure — just contact us.

JCL SOFTWARE
47 London Road, Southborough, Tunbridge Wells, Kent.
Tel: (0892) 27454

REPRODESIGN
131 Market Street, Chorley, Lancashire
Tel: (02572) 78376

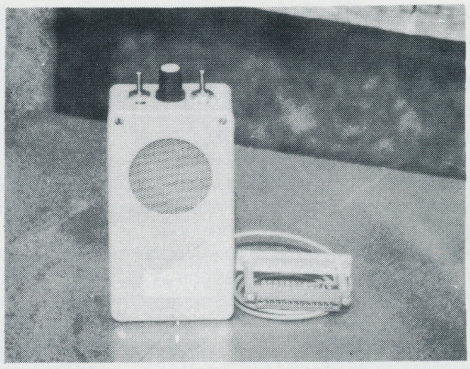
PET OWNERS

RESET/RESTORE BUTTON
£8.00



Recover from 'crashes' easily without losing your MACHINE CODE or BASIC program. Simple to instal. For 3000, 4000, 8000 series only.

SOUNDBOX
£15.00

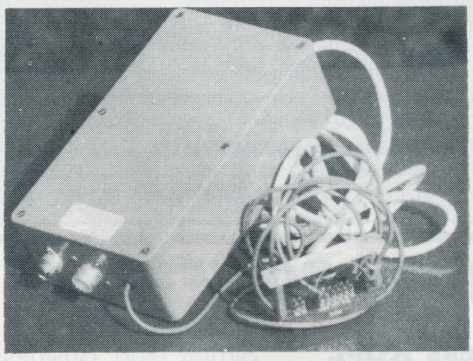


On/off switch, volume control and tape cue/listen device switch. PP3/PP6 battery required. Connects to user port.

LIGHT PEN
£15.00

Improve your programs, use light pen input and selection. Simply plugs onto the user port. Demonstration program supplied with the unit.

T.V./VIDEO INTERFACE
£31.50



Connect PET to a T.V. or to a Video monitor. This unit has its own fully fused power supply included - no need to use your valuable cassette connector. Three picture adjustment controls included.

NEW DEVICES FOR YOUR PET

1. Replacement for error light on disk unit, thus enabling you to tell when the disk in on. LED glows green, changing to red when you get an error; also gives audible warning. £11.95
2. PET printer paper out device gives audible warning when running out of paper, thus preventing the print head from being damaged. A definite money saver. £11.95
3. Disk safety device: if there is a break in mains supply, the disk will not come on again until the reset button is pressed. Saves you possibly months of work. Ideal for the business user. £11.95
4. Replacement cover for PET printer. This device is a direct replacement for the printer cover, so you can now see what is being printed as it is printed, instead of four lines and possibly many errors later. £7.50
5. Paper tear off for PET printer. Enables you to tear paper at any point. Clips directly on to the tractor unit, so goodbye to expensive perforations and wasted paper. £11.95
6. ROM Expander. At £12.95 this plug in board allows two x 4K ROMs to occupy the same socket. Switch selectable.

We will combine interfaces onto single connectors wherever possible thus giving YOU the user more on line devices.

Many programs available at £1.25 each. 5% cash discount. P&P £1.25. Please add 15% VAT to payment. Access, Barclaycard, Diners & American Express now accepted. Special Service: credit card telephone orders accepted between 6 p.m. and 8 p.m.

WE RESERVE THE RIGHT TO ALTER THE DESIGN AND SPECIFICATION WITHOUT NOTICE.

Tel.(0385)67045

Qwerty Computer Services

20 Worcester Road, Newton Hall, Durham

JARGON

A

Acoustic coupler

Post Office telephone lines are intended for voice transmission signals. The coupler converts pulses of sound from a telephone line into the *digital* signals a computer can understand; and conversely it converts digital signals into the *analogue* pulses which can be sent down a phone line. Basically a coupler is the same as a *modem*, but it is not plugged directly into the telephone line; instead, it uses an ordinary telephone receiver. If you have a terminal with a coupler attached, and if you know that somewhere there is a computer with a telephone line of its own, you can dial the computer number. You then place the telephone receiver handset into a shaped recess on the coupler and you can use the terminal in the normal way to send and receive data. It all sounds wonderful, but at the other end your computer normally needs a telephone line of its own (not cheap); and you cannot send or receive any faster than 30 characters per second (usually much slower, in fact). The Post Office isn't all that keen on couplers, either – assuming they get to know that you're using one – because in theory the digital transmission can muck up voice communications on the line.

Array

An array is a set of *variables* which may be arranged within a logical relationship. It may refer to data, or to

ASCII

American Standard Code for Information Interchange. This was established by *ANSI* in 1963. It is one of the standard ways of representing alphanumeric characters in *binary code*, where specific binary patterns correspond to particular alphanumerics.

Assembler

The most direct way of programming a computer is by means of zeros and ones; that produces the *absolute* code or *object* code which the computer can understand. People do not do too well with it, however, and it is laborious to write out and understand. So a variety of shorthand forms more comprehensible to humans has been developed. One stage removed from binary coding is assembly code; it uses mnemonics which are decoded (or 'assembled') by a special program (the assembler), into machine-readable code. For example, on the Intel 8080, the instruction move the contents of register L into register E will be keyed in at a terminal as 'MOVE,L'.

After the assembly stage, though, this would be converted to an almost incomprehensible 8-bit binary instruction, 01011101.

To summarise: an assembler is a programming language, assembly code is the coding for a program written in that language. Virtually every computer has an assembler of its very own, a purpose-designed and very specific programming language that can't be used on any other computer. Assemblers are called *low-level languages* because of this.

Asynchronous

This term is normally applied to terminals. An asynchronous terminal cannot be connected to a *synchronous* connection. More specifically, it is a mode of working which is not dependent on the accepting device or the processor internal timing requirements. For instance, data signals transmitted over a telephone line do not have to be synchronised with a processor's internal machine cycles.

Aficionados abbreviate this term to 'async'.

B

BASIC

The Beginner's All-purpose Symbolic Instruction Code is popular, easy to learn, easy to use, and available widely on minis and micros. Not the most elegant or space-saving of programming languages, it compensates for this by being one of the easiest to handle. BASIC programs are not portable from one machine to another, but recoding for different computers is straightforward: and once you have learned it for one machine, it is easy to convert yourself to another.

Still, it is worth noting that no two BASICs are completely alike. They vary in particular on number handling and decimal arithmetic, the way they use strings of characters, formatting of output, and file systems. Nor is BASIC entirely the best thing since sliced bread, even in its fullest versions. Its arithmetic capabilities are restricted by the limited built-in functions, limited precision, and slowness of execution. String handling is minimal, making it difficult to manipulate lists of information. And the syntax of the language limits the complexity of the programs which can be written.

Even so, if an idiot like me can write BASIC programs, anyone can.

Bit

The bit is the basic unit of information storage in a computer. The name comes from *binary digit* (get it?) and any bit can represent a 0 or a 1. Which it represents depends on the voltage level in that physical location in the computer. A bunch of bits is a *byte*.

C

Carriage return

The 'carriage' in question is originally that bit of a printer mechanism which actually holds the print element, the part which causes a character to appear on the paper. So a 'carriage return' takes the print element back to the start of a new line. You can cause this to happen by including a 'carriage return' command in a program, or you can do it yourself on a keyboard by pressing the key labelled 'return' or 'carriage return' (or sometimes 'enter').

You get the key on the keyboard of a display terminal too, and of course a program that outputs to a VDU can include a carriage return command. Obviously you won't be moving any print element, since your VDU won't have one. Instead the command moves the *cursor* and takes you to the start of the next line.

CMOS

One of three types of MOS (metal-oxide silicon) semiconductor technology, the other two being *PMOS* and *NMOS*. It beats the other two for low power consumption, which makes it great for some electronic applications – especially those requiring high reliability. But NMOS is able to operate faster, and gets the vote for others.

Column

Printers are sometimes described in terms of 'columns' – for example, 'an 80-column printer'. This is just an historical irrelevance: it means 80 characters per line, but if you fill several lines with print you will indeed have vertical columns of characters.

Communications

This one is a real jungle of techniques and terminology. As a blanket term, it can refer to computer systems where one part is linked to another to allow transmission of information over a communications line which is normally an ordinary telephone line. Things become very complicated when there are numbers of system components sending data to each other, and a whole sub-culture has developed in the computer industry which concerns itself with exactly how you organise those components and the information flowing between them.

So let us remain with the simple end; communications are what happens when two system components communicate, and they communicate by sending data to each other.

Constant

As opposed to a *variable*, it's a quantity or some alphanumeric data that doesn't change with time – or during the running of a program. Your company name used in report headings could probably be treated as a constant, for example.

CPS

Characters per second.

CP

Abbreviation for card punch.

CP/M

An *operating system* that has been adopted in one form or another on numerous microcomputers – often with name-changes to disguise the origins. It was originally developed by Digital Research Inc in 1976, and is now a mature and widely available system. The point about this is that it is the operating system which broadly determines whether a particular software *package* will run on your computer – and if you have CP/M, there are dozens of off-the-shelf packages available to you.

CPU

The central processing unit of the computer used to be easy to define, since it was the black box into which everything else on a computer system was hooked. It was big, and performed all the calculation and control functions in the system. A popular analogy was with the human brain, and that was about as useful as most analogies.

It is harder today to identify the CPU as a unit in its own right. It is still the part of the computer system which carries out the arithmetic and logical processes to which data is subjected, and it exercises final control over the physical components of the computer system.

Cursor

A cry of rage at finding the gerbils have made a nest out of your *Star Trek* source listings. Also, a means of indicating that position on a VDU screen where the next character will appear, either by typing in the character or the computer sending it to the screen. The cursor might be a square of light, a blinking underline, or an illuminated hollow square.

Cursor is also the name of the first magazine to be published as a cassette (rather than as paper) for microcomputers. It is produced for PET owners: you load it on the PET, run it, and each 'article' turns out to be a program. Some of the programs will just display information like PET news and views on your PET's screen; others will be games and PET routines that you can use yourself in your own PET programs. A neat idea. *Cursor* does have some competition now, but it remains the best of the bunch.

D

Data

This is what it's all about; everyone knows data is what the computer 'does' or 'uses' or 'has'. Data is just information which is processed, stored or produced by a computer. There are two wrinkles, though. In fact 'data' is a plural noun – one piece of data is a 'datum'; but you don't find many people following the strict grammatical rule. The language moves on and so data is generally singular. In any case, it is more helpful to think of data as a composite rather than a collection of

COMMUNICATIONS

If you want to talk about Viewdata or Prestel in particular there's only one company to talk to:

B&B [Computers] Limited

The Consultants for the North West

SUITE 1,
124 NEWPORT STREET,
BOLTON BL3 6AB.
LANCASHIRE.
Tel: (0204) 26644, 382741
Tel: TECS (0204) 384599

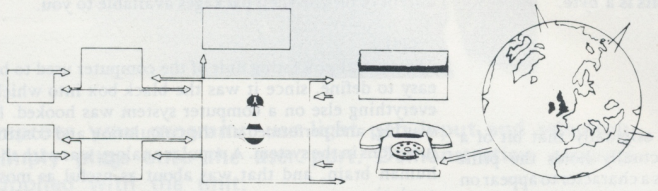
BEE LINES

FIRST PRODUCT FOR NATIONAL RELEASE

This could BEE you

The Bee. (Prestel on your Pet)

NOW P.O. APPROVED



TECS 4800 will support 32 PETs – not 32K – via the telephone or hardwired. Price on application.

THE BEE View data on the PET or any other micro. **£575.00 plus VAT**

10% SECURES ONE OF FIRST DELIVERIES.

DEALER ENQUIRIES INVITED. PRESTEL IS A P.O. TRADE MARK

Educational establishments invited to take part in FREE BEE experiment at no cost. Write for details.

ALL CHEQUES TO B. & B. (COMPUTERS) LTD. RENTAL CAN BE ARRANGED.
DELIVERIES OF HARDWARE 60/90 DAYS.
SOFTWARE EX STOCK.

STOP PRESS: Ring for cash & carry mail order special offers on our normal BEE Lines.

B&B [Computers] Limited

The Consultants for the North West

SUITE 1,
124 NEWPORT STREET,
BOLTON BL3 6AB.
LANCASHIRE.
Tel: (0204) 26644, 382741.
Tel: TECS (0204) 384599

COMPUTER RETAILERS ASSOCIATION CRA

small systems engineering limited

2-4 Canfield Place · London · NW6 3BT · Telephone 01-328 7145/6

IEEE-488 PET INTERFACES

B200	Bi-directional RS232C serial	£186
Type C	Uni-directional RS232C serial	£120
AP	Addressable parallel for Centronics or Anadex printers	£106
GPI AP	Micro based bi-directional serial interface with buffering Custom GPI software development for special interfacing requirements	£249

All serial interfaces incorporate:
- Software or switched Baud rate selection with 16 different rates selectable
- Crystal controlled Baud rate
- Full RS232C handshake
- 20 mA current loop I.O. option.

OFFICIALLY APPROVED BY COMMODORE

All the above interfaces have two modes of code conversion to match print out to the PET screen for either display mode.

Non Addressable parallel	£45
TV/Video interface	£35

We also stock a range of PET connectors

PET SOFTWARE
Intercomm . . . .

General-purpose Asynchronous Communications package . . .
- Emulates a wide range of terminals
- Sends and receives program & data files
- Permits communication with mainframes, networks, other micros, other PETs

Wordcraft 80	£350
Basic Compiler	£375
TCL Pascal	£200
	£120

RICOH R.P.1600 Daisy Wheel Printer
- 60 CPS Printing Speed
- 124 character print wheel
- Integral PET Interface
- Full maintenance contracts available

Fully compatible with Wordcraft 80/Wordpro 4 word processing packages.

NEW . . . RP 1600 with intelligent interface
- Bi-directional printing
- large buffer
- comprehensive set of escape sequence commands

MATRIX PRINTERS
Centronics 737

80 CPS proportionally spaced complete with non-addressable interface for PET £395
or addressable interface £445

ANADEX DP 9500/01 Line Printer
- High density graphics
- 200 CPS
- Parallel, RS232C and Current Loop Interfaces standard. PET interfaces available.

Prices: 9500 – £895 9501 – £995

Full range of PET computers and peripherals

We can offer expert advice on scientific and industrial applications.

PETS & PIECES

by Gavin Sanders

Chips with Everything

Simple space problems in this issue (and have you noticed how fat and colourful we're getting - PRINTOUT, that is) preclude the UDI of "Chips With Everything" as a separate feature - it made its debut in the last issue, you'll remember -so here it is again in my column.

I'm going to be really brief this time round, because there's lots of other things I want to get in. With luck therefore, you'll allow just the briefest mention of video games. By that, I mean those you play on your TV at home. And what an enormous number there are, both in terms of make, and also games you can play on them.

Mind you, the scene isn't without its nostalgia. You can go through your own personal version of "I wonder whatever happened to....." with quite a lot of the names of yestermonth. And therein, of course, lies one of the dangers of buying in the first place - will your chosen game console still be around next year (or even month) with a steady flow of new games cartridges for it?

Outright winner in the permanence and new-game-introduction stakes so far as got to be Atari, an off-shoot of Warner Brothers. But to my mind (and, of course, it's only one man's opinion), Atari isn't the best. There was a time, mind you, when I thought their inventiveness, graphics, sound and colour couldn't be beaten.

And then, like that lady who guzzles vodka, my life changed when I met Mattel's Intellivision. In terms of a really incredible screen display, astonishing sound effects and games you can really get your teeth into, Intellivision's got just about everyone beaten.

If you play their British soccer, you have men who really look - as well as running, kicking, dribbling, passing, taking corners and throwing in - like real, live football players. And some clever programming convinces you there's 11 of them too!

The pitch scrolls left and right as the play ebbs and flows (and it was doing it long before another recently announced football game claimed a "first" for that), while the electronic crowd cheers themselves hoarse.

The whole thing's done with something no other current video game has - a 16-bit microprocessor. The added-value which comes from using a 16-bit chip has to be seen to be believed.

Intellivision's not cheap, mind. Expect to pay around £160 or so. But when and if you do, remember one thing. Very soon now, another unit will appear into which Intellivision slots. The new unit is a full-function keyboard, and that'll turn Intellivision into a computer with up to 32K!

My allegiance to PET (and more recently VIC; see elsewhere in this issue) hasn't faltered, but it does get strained sometimes!

Tape Transportability

Not so long ago, you could run into nightmare problems. How? If you tried loading a tape program into your PET that had been saved on someone else's cassette deck.

The dreaded ?LOAD ERROR (after you'd waited all that time for the load) was an all too frequent sight. Even now it happens from time to time. And, of course, poor quality or worn out tape can produce the same problem, though for different reasons.

Well, you may well know this already, but entering PRINT-PEEK(192),ST for new-ROM PETs, or PRINTPEEK(630),ST for old-ROM machines, after loading a tape will show you just how many errors you had during the load, and whether the right signal was encountered at the end of it.

And that, of course, will tell you whether you have problems or not. The problems may not be of your making. Poor tape, or misalignment of the other chap's cassette unit will both produce fairly high results.

It works quite simply. Every PET program saved on tape is actually saved twice (which you also may or may not have known) When it's loaded, PET compares the first save with the second, and stores the number of differences in memory location 192 (or 630). Thus the first figure you get should be 0, which means no differences.

Actually, anything up to 4 is usually OK in practice, but higher than that will almost always cause oddities when the program runs, or even an immediate ?LOAD ERROR signal.

The second figure should also be a zero, which is what the Status Bit is when the correct signal is written (and read) at the end of the program.

If you really want to be adventurous, you can even use this PEEK to align your own tape heads. But that's complicated, and for another day perhaps. Certainly if you think about it, and try it, go slow and be careful!

A Quick Trailer

A Mr Parlett dropped us a line not long ago, bemoaning the rapidly escalating number of add-on (or should it be "in"?) chips for PET, as opposed to the strictly limited number of places in which to put them. Like only three empty sockets!

The problem's compounded by the increase in programs that use a "security" ROM. The idea is to make it either pointless or impossible to copy the software, because it won't work without the special ROM in position.

Well, our old friends JCL Software seem to have come up with an ideal answer. It's a board that fits quickly inside PET, which will hold as many extra ROMs as you're ever likely to add. Any of them can be activated with a SYS call, and is up and running before you know it.

We're testing the board right now, but I thought it worth mentioning early because the problem seems to get worse every week. Watch this space for more details if you need convincing further.

And Finally....

I'm indebted to Ian Clarke of (would you believe?) the Sutton Kennels and Cattery, Ely in Cambridge. He's sent me a program that takes but two ticks to enter; is simple but fun; and totally pointless.

But I'll bet my old boots someone's going to take it, and elaborate it, and turn it into some "gee whiz" spectacle. It's only a question of time. In the meantime, however, try this as sent by Ian:

```
10 FORJ=1TO999:PRINT"V";:NEXT
20 A=59468
30 POKEA,12:POKEA,14:GOTO30
```

And that's all for this month, folks! Happy hacking. See you next issue!

US reader Marilyn Chambers *(left)* wants to know what Gavin looks like. Happy to oblige, ma'am. Here *(right)* is a picture of Gavin and Personal Electronic Transactor

PRINTOUT has been mentioning VIC for several issues. Recently, GAVIN SANDERS had exclusive use of one of the first three to arrive in the UK. His reactions? Read on....

VIC REVIEW

CBM'S VIC: WORTH YOUR WAIT IN GOLD?

The trade has been buzzing for months with rumours about Commodore's new computer, the VIC 20. We were rather more than interested, as you'd rightly guess.

It had colour; it had sound; it had (or would have) extra goodies to plug in; it would cost less than £200; it sounded fantastic. But what would it be like in the plastic flesh, as it were?

And would Commodore go the same sad road they so terribly trod with the original PETs previously? User manuals you'd need a cryptographer to unscramble, and a distinctly unsympathetic attitude to anyone with a problem?

Well, I'm happy to say that VIC is everything I'd hoped for, and then some. Equally good, there's every sign that Commodore's attitude has undergone a considerable metamorphosis too.

In my opinion, VIC's going to give virtually every micro in its class a nasty jolt. It's not simply competitive in price - at £189 incl. VAT it's way under most micros, and those that are cheaper simply don't compete on features. It thus looks very like "no contest" for VIC's competition.

And though Commodore clearly know my PRINTOUT connection, I nevertheless felt a wind of change really had blown through their corridors, in terms of help and back-up they'd give.

But enough of the generalities - let's get down to specifics, one by one.

Perhaps the clearest evidence of Commodore's changed approach is the user manual that'll accompany every VIC, so let's start our close examination right there.

The VIC User Manual

Early PET users (and some of the newer ones too!) felt that Commodore's back-up manuals for PET, and the things you could plug into it, left a bit to be desired.

Some were a touch more forthright: "incomprehensible", "littered with errors", "no help at all", "if you're a beginner, forget it", - these were the more printable comments. And, to be fair, Commodore have accepted these criticisms of late, and tried to do something about them.

The VIC User Manual is clear evidence that they've learnt the lesson. I have two typescript drafts of what'll be the final manual, put together by a very professional firm specialising in such material. And it's warm, friendly, informative and helpful.

It's also well-written, heavily illustrated, pretty long, and positively stuffed with short but entertaining programs for the beginner to use to cut his or her teeth on.

Better, it's clearly constructed, for each VIC feature has a chapter to itself. the sum effect is a steady learning process, not only of VIC, but of programming in BASIC too. Work through to the end and you'll not only understand VIC; you'll be well on your way to writing programs of your own.

It has a large number of appendices covering the vital facts, such as the POKE numbers for colour, sound, musical notes and screen layout; all the ASCII codes; all the BASIC words (with very good explanations of each); and so on.

All these are in the appendices, where you can get them if you want, when you're good and ready, but not before.

Since VIC is aimed primarily at the home user, who may well never have laid hands on a computer before, the right manual was and is vital. I give Commodore full marks for a good job, which must have been very expensive to produce.

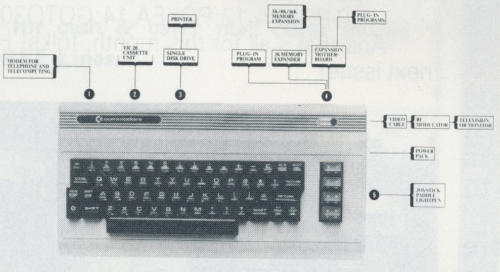
VIC as a Unit

The pictures on this page show you what VIC looks like, but not its size. In actual fact, VIC's about 16 inches long, 8 inches from front to back, and not quite 3 inches thick. This last measurement varies from front to back, since the keyboard slopes down to the user.

Its right-hand side has a socket for a light-pen, games paddle or joystick; and an on-off switch. The lead which goes to your colour (or black-and-white) TV comes out of the back.

The plug for the power unit, which is separate but included in VIC's price, goes on the right also. And 10 out of 10 to Commodore for putting two very long leads on the power unit. Thus it can easily stand on the floor, some way from VIC, and some way from the mains socket it plugs into.

Moving round to the back of VIC, things get really interesting. There's a very large slot to take the add-on units which are coming (about which more in a moment). They plug straight onto VIC's main board.



There are two other slots: the first is for the tape cassette unit, and the other is the user port (which doubles up as an RS232 interface also). Both are directly compatible with PET which means, for example, that PET's cassette recorder can be plugged into VIC instead, if you want.

With VIC, the cassette unit is called a "datasette", which I personallyt find a little yucky, but that's only me. The official VIC "datasette" is ivory in colour and has a tape counter, I'm told, so there may be a fairly healthy reversal of roles, with sales of "datasettes" going nicely for use with PET!

Finally, still at the rear, there are two DIN-type plugs. One is for the video output, and the other a special Commodore serial interface for the new VIC disk and printer.

VIC's case is plastic, but not so's you'd notice. It's cream-coloured and appears to be very hard. The effect is not at all "plasticky" in either appearance or feel (unlike other micros that come to mind).

The keyboard is full-size and has very good "feel" in use - rather better than my PET, I think, though the latter has been well-used, while my VIC was brand-new. There's absolutely no trace of "key-bounce" (again unlike some other micros!).

I won't go through all the key functions because that's not the idea of this overview, but at least one thing should be said because it represents a major VIC advantage.

Many of the keys produce no less than three different characters: one alphabetic and two graphic. The graphics are identical to those on PET, and the alphabetic can be either upper or lower case.

The ability to get at the different key possibilities comes from the little Commodore key at the keyboard's bottom left corner, used instead of shift to obtain the other set of characters.

All in all, VIC as a unit has a solid, chunky, reliable feel to it. It looks good, and everyone who saw it in my home simply wouldn't believe it was a full computer, but would cost less than, say, a reasonable hi-fi turntable.

VIC and Colour

I tried VIC on three different colour TV sets, and it worked perfectly on each. The connection is via an external box called the R.F. Modulator (also supplied complete with the VIC) straight into the aerial socket of the TV; I suspect that if a video monitor was used, the results would be even more impressive.

But a video monitor simply isn't necessary - the colour performance was very good under the conditions most people will employ.

VIC produces 8 basic colours: black, white, light blue (cyan), green, yellow, red, blue and purple (magenta). Any of these can be used for

the border around the main screen working area; or for the screen working area; or for the characters in the working area.

But things don't stop there. A number of extra colours are possible because of the ways in which the colours and the screen can be manipulated. The extras are orange, pink, and lighter-hued versions of cyan, magenta, yellow, blue and green. That's 16 colours in all!

The 8 basic colours can be obtained straight from the keyboard, which has keys marked with the colour names. Used while programming, these keys automatically produce a code in the program, which calls the right colour at the right time.

Alternatively, any of the 16 colours, together with the place it's wanted (border or screen background), can be whistled up with a judicious POKE at an appropriate point in a program.

And to demonstrate the VIC User Guide's excellence, every POKE is listed for the 128 different colour combinations of background and border.

And finally, if you remember that characters can also be coloured, you'll appreciate the staggering range of possibilities.

VIC and Sound

VIC's got four sound "voices". Three of them are musical (or produce a pure sine wave, if you want to be technical), and the fourth one isn't (and doesn't); its output is "white noise", which is indispensible for sound effects.

The sound arrives at the TV together with the picture, and is hear on the TV loudspeaker. Accepting the shortcomings of most TV sound systems, using the TV loudspeaker is a whole lot better than a little 3" speaker inside a computer.

Each of the three musical "voices" covers just over three octaves, so pretty fair musical harmonies are possible. And with judicious and fairly rapid switching, even better should be achieved.

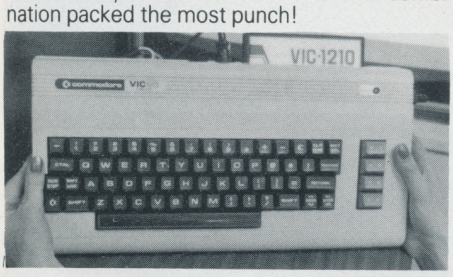
The note played by each one is set by a POKE, and the loudness of all three depends on another POKE. The loudest note is fairly loud, but not enough to flatten you.

The "white noise" pitch from the fourth voice is similarly set with a POKE, and the ability to vary this is what makes the combination of all four so versatile.

The User Manual thoughtfully provides a sample set of 16 or so sound effects programs, varying from "ocean waves", through "chirping birds" and "creaking doors", to UFOs landing, lifting off, and other celestial manoeuvres.

The simple addition of sound to many programs vastly improves them, as lots of us already know. VIC upgrades sound to a far more sophisticated level than previously, and I was hard pressed to decide which was more fun: colour or sound.

Eventually I had to decide that both in combination packed the most punch!



VIC's Screen Layout

There's no doubt at all that it will be VIC's screen layout that'll upset or disconcert most users. At least, and to be more precise, most PET users.

VIC does not use the entire TV screen for its working area. There's a fairly large border surrounding a rectangle, and it's in the latter that any display appears.

The rectangle allows 22 characters for each line, and 23 lines from top to bottom. The latter figure isn't much different to PET, but the number of characters per line is only just over half PET's capability (or a quarter, if you're an 80-column user).

The first thing that hits you is the way the characters are spread out and flattened, followed seconds later by what seems like a very small number of them on each line.

Quite frankly, I found it very weird - but just as frankly, I got used to it much more quickly than I'd thought possible. Like, within half an hour or so.

But what I thought of it, and what you'll think of it if you're already a PET-user, is absolutely irrelevant. What matters is what the first-time computer user will think and feel.

And I got quite used to being elbowed out of the way by all sorts of people, young and old, each of whom wanted to try VIC out. That automatically led them to entering programs, and not one of them expressed any concern at all at the line length.

The conclusion is inescapable: first-time users won't have a problem, and current PET users may have to take a short while to get accustomed to the differences.

Mind you, it must also be said that the 22-column width will inevitably pose some severe constraints on screen layouts, with programs that depend on screen displays of information or whatever.

I suspect, however, that a number of ingenious and "lateral-thinking" methods will be found round this undoubted disadvantage. And I have to say again that I'm speaking from a subjective PET-display viewpoint. My reactions may well not be those of new users.

VIC's Add-on Goodies

Let me say right away that there are, or soon will be, a bewilderingly large selection. And that's only from Commodore, not those innovative entrepreneurs who specialise in producing extras for computers that turn into best-sellers. When they get moving, the sky may well be the limit.

First things first though. Your new VIC will have a frighteningly small amount of memory for you to put your programs in. Would you believe 3,583 bytes?

So you'll be relieved to hear that plug-in memory expansion modules will very quickly be available, and you can take VIC right up to 32K with them. In addition, some of the specialised plug-in modules themselves confer extra memory.

For instance, I'm using one which zips me up to the 8K I cut my teeth on way back with PET - the high-resolution graphics module. It adds 3K of memory; provides a very effective hi-res ability; and does other good things too.

More importantly, the high-resolution function suddenly gives you a screen of over 176 by 159 points to play with (in colour, don't forget). After 22 by 23, that's like coming out of a blizzard into central heating - it makes you sweat for a while!

By now you may be wondering how all the various modules are going to plug into the one slot available for them. Good question. Fear not, however - an "expansion motherboard" is on the way. This plugs into the slot, and you then go ahead and plug all your bits and pieces on to it.

I've already mentioned the single disk-drive that's on its way, and the light-pen, joystick and games paddle. There's also a printer due and, more technically, an IEEE-488 interface to link VIC to PET and its peripherals.

Also due are pre-programmed cartridges for home applications, games and - hold tight - business use. I can't somehow see a full-scale stock and inventory control program running on VIC, but a tiny voice inside me is saying I could easily be wrong. We'll see.

And that's the story of VIC so far, from my own point of view. You want a quick summary? It's easy.

Conclusion

I think VIC is already a potential winner ("potential" only because, as I write, it's not yet on sale). But as soon as it's on the market, that potential is rapidly going to become an actuality.

I watched the reactions of more than a dozen people in my home, as they played, experimented, and generally tried it out. Not one of them had previous computer experience. Virtually all of them had, at some time past, said something like "Computers? No, I'd never understand them."

Everyone was entranced. Everyone wanted one. Seven have the money ready now. Three of the teenagers have started saving. One has given up smoking to afford it. How can it fail? This time, Commodore have got it dead right!

low cost high quality interfaces....

3D

We are specialist suppliers of CBM PET and HP 85 compatible interfaces.

We also supply complete systems for industrial and laboratory monitoring and control.

Custom design undertaken.

Callers welcome for demonstration.

IEEE-488 compatible systems....

● 8 channel 12-bit A/D convertor	£600
● 8 channel 12 bit D/A convertor	£695
● 16 channel 12-bit A/D convertor with software programmable amplifier.	£850
● 16 channel 8-bit A/D convertor	£300
● 8 channel 8-bit D/A convertor	£350
● X-Y analog plotter interface	£200
● digital data input unit, 64 bits	£400
● digital data output unit, 64 bits	£350
● 16 channel relay control unit	£350

All the above units are boxed complete with IEEE-488 address internally selectable, integral power supply, switch, fuse, indicators etc. Illustrative BASIC software supplied.

● user port convertor A/D plus D/A	£200
● fast data acquisiton system 40,000 readings per sec. 4 A/D + 4 D/A	£950

All prices EX-VAT.

Digital Design and Development

18/19 Warren Street · London W1P 5DB Tel: 01 387 7388

WHICH INTERFACE?

Following on from 'Interfaces Explained' in last month's issue, we now present a state-of-the-art guide to the interfaces currently available.

Edited by Dennis Jarrett

Most of the interface makers are concerned at the amount of attention being received by commercial applications on micros. They feel that most of the activity is going on in the real world of industry - "that's where most of the sales are and where most of the interesting developments are being done", as one of them put it.

And if you're in doubt about that activity, read on. Included here are the standard and familiar items, like IEEE-to-RS232 converters to drive printers. But we also cover some cleverer and more unusual interfaces that exhibit a good deal of problem-solving imagination.

All interfaces listed here are for the IEEE port unless noted.

Amplicon Electronics,
Richmond Road,
Brighton,
East Sussex BN2 3RL
Tel: 0273-877470

An established and respectable Official Commodore Dealer with a variety of high-grade add-in software and hardware products, including the UK agency for the products of ICS Electronics Corp.
4830 isolated bus expander: adds up to 14 more IEEE-compatible instruments to the bus while isolating them from the PET's digital signals and ground. £575.00
4883 BCD interface: talkers, listeners, and both. £675.00
4884 RS232-IEEE converter: includes 20mA current loop. Speeds to 9600 bps. £675.00
4886 bus extender: connections up to 4,000 feet - compared with the normal 20m limitation of IEEE-488 cabling. £925.00
UPI-21: hardware plus software user port interface, feeds up to 21 parallel TTL level bits into the user port (usually as 51/2 bits of BCD). £65.00

Anaspec Research Laboratories,
Data Systems Division,
Pearl House, Bartholomew Street,
Newbury, Berkshire RG14 5LL
Tel: 0635-44329

Definitely one of the top suppliers of complete PET-based instrumentation control systems, Anaspec has had to develop a whole line of standard interfaces for its own needs and this impressive range is available off the shelf.

Fast data acquisition system: eight analogue input channels, four analogue outputs, eight-bit resolution, and up to 40,000 samples per second for £1,425.00
8-channel 8-bit parallel digital data acquisition unit (can be 4 channels of 16 bits or 4 channels of 4 BCD digits): £500.00
16-channel 8-bit A-to-D: £375.00
8-channel 12-bit A-to-D: £725.00
8-channel 8-bit D-to-A: £425.00
8-channel 12-bit D-to-A: £825.00
Single-channel 8-bit D-to-A and A-to-D: attaches to the user port - price £250.00
X-Y plotter interface with pen lift: £250.00. Anaspec can supply HP 7225 for A4 plots (£1,620.00) or the Computagraph A3 plotter (£2,475.00).
16-channel relay controller: £425.00
Stepper motor controller: for one four-phase motor (£770.00) or one five-phase (£1,100.00).

Audiogenic,
P.O. Box 88,
Reading,
Berkshire
Tel: 0734-595269

Audiogenic is a well-known mail order supplier of mass-market PET extras like books and cassette programs. They also sell a number of the better US accessories, like these interfaces.
ADA 1400: addressable unidirectional IEEE/RS232 interface from Connecticut microComputer at £99.09 - printers can output upper and lower case.
ADA 1600: Centronics-equivalent version for £67.73
Tempsens: neat £26.16 temperature-to-voltage converter with two temperature probes.
SADI serial/parallel interface: bidirectional IEEE/RS232 communication at the same time as Centronics-compatible parallel output is going on. £170.41
CB2 sound box: user port connection, price £15.50. Another £39.50 buys the Visible Music Monitor, an 8-bit A-to-D converter and on-board amplifier plus machine code to display as four-part musical notation your keyboard entry.

Bright Electronics,
29-31 Wincombe Drive,
Ferndown,
Wimborne,
Dorset, BH22 8HX
Tel: 0202-875075

Bright modestly describes itself as "a small company rendering specialist manufacturing services to the electronics industry in coil winding, PCB assembly, and prototype wiring". Its PET interfaces resulted from related circuit design work; they mostly relate to printer connections, but Bright must be one of the very few companies that have been asked to interface an Italian credit card embossing machine to a PET (they did it, too). The prices look very good.
2/PI printer interface for "most" parallel printers: cheap and simple but effective. £32.00
5/PA: an addressable version, complete with switch-selection for upper/lower case. £60.00
4/TVI: monochrome output to TV or video monitor for £22.00.
6/SA: a new unit, a unidirectional and addressable serial interface for RS232, 20mA current loop, and TTL levels: crystal controlled baud rates to 9600 bps, parity selection. £85.00

Caddis Computer Systems,
72-74 Trinity Lane,
Hinckly,
Leics. LE10 0BH
Tel: 0455-613544

Caddis reckons it was one of the first UK suppliers to offer interfaces for "the popular microcomputers such as the Commodore PET". Its current line is the 80 series, designed and manufactured in BRITAIN (Caddis's capitals) and modestly described as a "high specification product at exceptionally low cost". Each of the current interfaces gets an on-board M6800 to handle the functions: more family members are promised.

CAD80-488: addressable IEEE/RS232 serial communications at baud rates to 9600 bps over single-ended 24V links (which means RS232 or CCITT V24) or high-speed balanced lines (to the RS422 specification). Or you can connect two back to back, in which case the input and output IEEE buses appear as one - and that means in effect the IEEE bus can be extended over "considerable" distances at low cost. £325.00
CAD81-488 binary/BCD interface: 24 lines, can be six BCD. Price £255.00.
CAD82-488: 16 channel A-to-D converter. Four input ranges may be specified, including the 4-20mA of many transducers. Output resolution is 1:255. Price £285.00.

3D Digital Design & Development,
18-19 Warren Street,
London W1P 5DB
Tel: 01-387 7388

3D is not unconnected with Small Systems Engineering (there's a common director) and it is run by an ex-physicist and an ex-electronic engineer,

which all in all is as good a background as you could wish for in a company that describes itself as "specialist suppliers of systems for industrial and laboratory monitoring and control". Certainly they are tops when it comes to analogue interfacing, as evidenced by the extensive product range -and an impressive collection of blue-chip customers.

They also get Brownie points for their ways of doing business - always keen to talk, no-quibble guarantees, fast deliveries, fast turnaround on repairs. In addition to standard items listed, the service includes a lot of custom work, programming if you need it, and complete Sharp and PET configurations as required.

16-channel 8-bit A-to-D converter: the first 3D product, "hundreds" sold - now £300.00
8-channel 12-bit A-to-D: £600.00, currently the most popular 3D line. ICI took the first one.
8-channel 8-bit D-to-A: £350.00
8-channel 8-bit digital data input: £400.00
digital data input: 64 latched TTL outputs: £350.00
X-Y plotter interface with pen lift: £200.00
16-channel relay control unit: £350.00
fast data acquisition system: clever use of memory port to enable ordinary oscilloscope to be used as a storage scope, running simultaneously with other BASIC programs - eight independent analogue inputs (sampling rate up to 40,000 per second), four analogue outputs. £1,200.00
user port converter: single-channel A-to-D and D-to-A, the only 3D product for the user port, especially good for schools, demonstrated impressively with voice input and playback. £200.00

Direct Data Marketing,
22 Warley Hill,
Brentwood,
Essex
Tel: 0277-229379

Bidirectional IEEE-to-RS232 interface mounted internally. Speeds to 9600 bps (crystal controlled baud rate selection), fully addressable, switched parity selection. £175.00

Feedback Instruments,
Park Road,
Crowborough,
Sussex TN6 2QR
Tel: 08926-3322

Feedback'a novel angle is educational interfacing. "The user of a computer in the office environment need know nothing of how the line printer (for instance) is controlled by the computer. However, the new generation of technologists will need to sort out far more complex processes involved in the control by microcomputers of all kinds of machines..."

Feedback has "effective and realistic" simulations of real end-user products, and these 'Application Modules' can be plugged into the PET. In a sense they are interfaces, though they are hardly conventional I/O intermediaries. You get a mounting deck containing an IEEE connector that is plugged via a ribbon cable into your PET: also in the mounting chassis is one of Feedback's application modules. Currently available are simulators for a washing machine, stepping motor, and temperature control; there's also an uncommitted board, with a generalised A-to-D and D-to-A converter coming soon along with other modules.

Felden Audio Ltd.,
125 Great Portland Street,
London W.1.
Tel: 01-580 4314

As well as the professional audio products implied by its name, Felden is an official Commodore dealer. It has one highly specialised unit for the PET, the THS 224 spectrum analyser from a US company called Eventide Clockworks Inc. (funny how they think of rather more interesting names for their operations, isn't it?) and Felden reckons a PET plus the frequency analyser works out at half the cost of a stand-alone equivalent. Mounted internally as one PCB, it provides 31 analogue third-octave filters, A-to-D converter, and machine code in ROM. £340.00 - and incidentally there are versions for Apple and TRS-80 too.

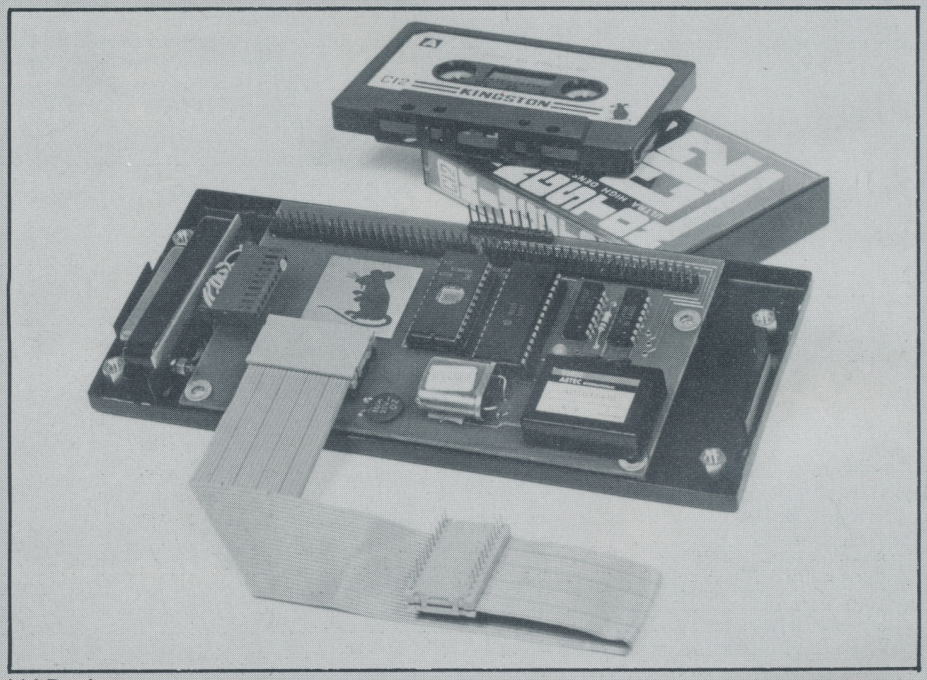
ICI,
Physics and Radioisotope Services,
P.O. Box 2,
Billingham,
Cleveland TS23 1JB
Tel: 0642-553601

The PRI 76 GammaTrol Interface System is a "universal" interface the applications for which are "as limitless as the ingenuity of the user". That means it's a box which will take eight signal boards, which can be any mix from the total of nine different boards available: extras can be added later. It runs from the user port, takes power from the second cassette port, and features PCB edge connectors for the plug-and-socket link. Using the user port means I/O can be done quickly even in BASIC (one operation per 25 ms, about 60 microseconds if you use machine code).
Master unit: £230.00
Pulse counter: £120.00
12-bit analogue input: £195.00
12-bit analogue output: £220.00
8-bit analogue input: £150.00
8-bit analogue output: £155.00
16-bit digital input: £120.00
16-bit digital output: £130.00
8-bit digital output: £160.00
Dual fail-safe watchdog: £120.00

Kingston Computers,
Electricity Buildings,
Filey,
North Yorkshire YO14 9PJ
Tel: 0723-514141

"Ideas and products to extend your system inexpensively" is the proud boast on Kingston's price list. As well as its own manufacturing operation (vide the very interesting Netkit intelligent communications adapter covered in our February/March comms survey) the company is known as an active importer of some of the best American bolt-on goodies for the PET, some of which it enhances for UK consumption.

Kingston's products are usually sold through dealers. Given here are the recommended retail prices, but they may vary locally.
24-bit digital input (could be six BCD digits): £195.00
ADA 1200: a basic non-addressable unidirectional IEEE/RS232 interface from CmC at £60.00. Designed for the old-ROM PETs but will work with new ROMs.
ADA 1450: another from CmC, a fully addressable unidirectional IEEE/RS232 connection with upper and lower case conversion and a variety of switch-selected options. £96.00
ADA 1600: Centronics-compatible IEEE-to-parallel version of 1450. £76.00



IJJ Design,
37 London Road,
Marlborough,
Wiltshire SN8 2AA
Tel: 0272-292966

IJJ is the agent for Micro Technology Unlimited, a company probably best known for an impressive £57.00 music synthesiser (user port connection, four part harmony, interpreter software on cassette, good documentation) and an interesting high-res graphics system - 200x320 matrix, hardware and machine code software included in the price of £350.00.
PROM-I/O programmer: the graphics interface board is also used for this MTU product. It provides for up to 24K of PROM (2708 or 2716s), will program it, and also has one serial and four parallel I/O connections. Price is £211.00

Impetus Computer Systems,
Classic Offices,
Hendon Central,
London NW4 3NN
Tel: 01-202 2726

Inpet IEEE-to-RS232 interface: intended specifically for printers; features speeds to 9600 bps and automatic conversion to true lower case. Fits completely inside the PET - "no trailing wires". Price £185.00, and not to be confused with Plessey's 32K memory add-on of the same name.

TNW 2000: addressable bidirectional IEEE/RS232 from TNW Corp at £160.00
TNW 3000: a version with crystal-controlled baud rate and a 20mA option. £265.00
TRICE: Kingston's own IEEE/RS232 interface, not yet in full production but looking promising - a modular approach involving plug-in building blocks to take you from single-ported unidirectional interfacing for about £50.00 up to three-ported configurations with buffering and multiple addressing (around £150.00). "It is seen as a replacement for majority of interfaces currently being sold" notes Kingston modestly.
Petset: a 16-channel 8-bit A-to-D converter from CmC. Conversion times 100 microsecs maximum. £160 for the basic version, but there's a £30 expansion interface available which allows you to plug together several Petsets and configure up to 128 channels in total.
Tempsens 2P1: neat £35.00 temperature-to-voltage converter with two temperature probes.

Kratos Instem Ltd.,
Walton Industrial Estate,
Stone,
Staffs ST15 0LT
Tel: 0785-812131

Kratos have been in the industrial control and data collection systems business for some time now. "Low-cost monitoring and control" is its promise

for the Link-On interfaces. These are very neat addressable units (you set four internal switches) with LEDs to indicate the status of their lines. Up to 16 Link-Ons can be daisychained, which means a possible total of 256 analogue signals of 384 digital signals - inputs and outputs. They can also be mixed, of course.

Rather than co-ax, the cabling is a simple twisted-pair so it is cheaper and easier to spread Link-Ons around the place.

The drawback is that Link-On attaches to a 20mA current loop, so for the PET, you'll need an IEEE-to-20mA converter (many IEEE-to-RS232 include the 20mA alternative as a built-in option). 8-bit digital input and output (12 channels apiece): basic model £205.00 for TTL levels; or £250.00 for 50V DC on outputs, £295.00 for 240V - both with 24V on inputs.
16-channel A-to-D (or 8 differential) with 2 digital inputs and 2 digital outputs as well: £360.00 for 2V, £430.00 for 20mV.

Machsize Ltd.,
York House,
Clarendon Avenue,
Leamington Spa, CV32 5PP
Tel: 0926-312542

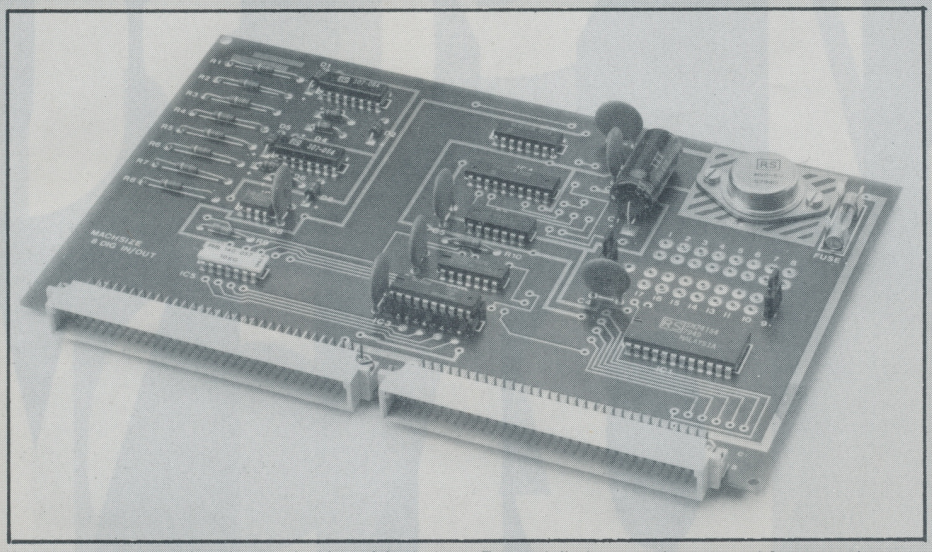
Machsize is a specialist in applying micros to gauging and tool-making, and to do that it converts the standard CBM kit into rack-mounted units: it's probably taken the use of industrial rackable PETs further than anyone else. Customers include the Leyland Metro: all engine production tests are monitored and recorded by a Machsize set-up using a racked PET. The principal Machsize interfacing product is a highly engineered card frame containing an IEEE-488 decoder card and 10 free slots, which you can fill with a mix from the options listed: prices quoted are for the card in question sitting in the frame. Machsize also does some cheap user port interfaces which look good for educational uses.
8-bit single-channel D-to-A and A-to-D: typical A-to-D conversion time is 20 microseconds. £225.00
dual A-to-D, one 12-bit and one 16-bit: £425.00
12-bit D-to-A: £225.00
8-channel digital I/O: £225.00
24-channel multiplexer: drop the cost-per-point of a big A-to-D system by using the mux with a converter - price £195.00
24-line digital output (addressed as three bytes): £195.00
24-line digital input: £195.00
24-bit binary digital output (could be six BCD digits): £195.00
24-bit binary digital input: £195.00
four 8-bit totalising counters: £245.00
four 8-bit D-to-A converters: £245.00
bidirectional RS232: £195.00
user port workshop: interesting freestanding 'introduction to interfacing' board. Pushbutton switches for the eight input lines, LEDs to indicate status, full handshaking. £69.95
user port 8-line digital I/O: £69.95
user port digital input - six BCD lines: £69.95

MC Computers,
Park Street,
Newbury,
Berkshire RG13 1EA
Tel: 0635-44967

Part of the Micro Consultants group, MC is a long-established and now highly specialised design and manufacturing company for micro-based products. To get into that position it has had to develop a good many special interfaces, one of which it sells off the shelf as the PIP Plant Interface Peripheral.
Developed originally for an oil spillage monitoring project at the National Maritime Institute, PIP is a micro-controlled I/O subsystem incorporating a 12-bit A-to-D converter and four PCB slots for plug-in cards to drive up to 128 channels. A variety of off-the-shelf interfaces are available - digital input and output cards (16 channels each), 12-bit analogue input with 32 single-ended or 16 differential channels per card, and analogue outputs (two per card).
Though not intended specifically for the PET, PIP has an IEEE interface among its options.

MDR Interefaces,
Little Bridge House,
Danehill,
Haywards Heath,
Sussex RH17 7JD
Tel: 0825-790294

MDR can supply its 'Microcomputer Control Interface' for the IEEE interface or for the user port. Essentially it comprises a card frame and one or more PCBs each of which provides for eight digital inputs and eight digital outputs. The price for that is £350.99 on the user port, £416.97 on the IEEE port: further eight-channel cards can be supplied to a maximum of 32 inputs and 32 outputs.



Mektronic Consultants,
Linden House,
116 Rectory Lane,
Manchester M25 5DB
Tel: 061-798 0803

Mektronic is yet another of the British electronic systems design houses which have established themselves solidly around the PET. Its Communicator featured in our February/March comms survey: an example of its custom interfacing work to emerge as an off-the-shelf product is the subsystem to attach MSI's hand-held data collection terminals to a PET. All of the products listed here plug into the user port.
Commander: neat digital I/O box, with a choice of up to 32 input and/or output lines (four at 8 bits - scan time is 200 microsecs for 8 bits). Price is £580.00 including the four I/O cards. An add-on module to house another eight I/O cards is £300.00, cards are £60.00 each: Mektronic says analogue I/O will also be available. User programming involves PEEKs and POKEs: Mektronic supplies machine code for I/O control, too.
Scullion: £185.00 controller for six 10A mains electricity sockets; can switch on and off, but can also vary power supply.
Communikit: eight analogue inputs and eight outputs (some at 500mA, some at 800mA) - plus control lines for handshaking, which can extend the capacity. Just £79.00, or £49.00 as an "extremely simple" kit.

Petalect Electronic Services,
33-35 Portugal Road,
Woking,
Surrey GU21 5JE
Tel: 04862-69032

One of the best-established Commodore dealers, Petalect has always been big on business systems and an emphasis on reliability, professional service, and prices to match ("people that cut their prices to the bone do the same with their service"). Interfaces it has are the stock RS232/IEEE converters and a more unusual line of electronic balance interfaces.
RS232-PET interfaces: unidirectional (typically for a printer) £120.00, bidirectional £195.00.
Balances: Sartorius and Oertling at £99.50, Mettler and Sauter at £125.00. Some Sauters require some extra interfacing work on top.
Pye Unicam SP8 100: £99.50.

PPM Ltd.,
Hermitage Road,
St. Johns,
Woking,
Surrey, GU21 1TZ
Tel: 04867-80111

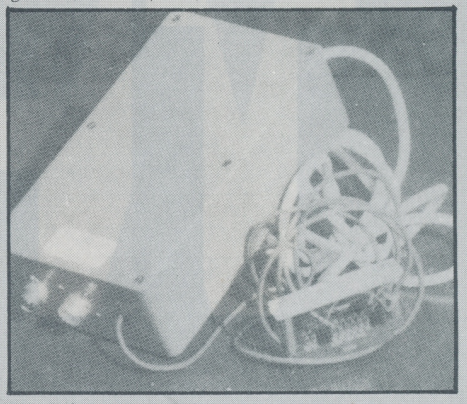
"More experienced, more quality and service conscious than other PET dealers" proclaims the PPM brochure. The company reckons it has supplied more PET-based instrumentation systems than any other company; though we were told of no off-the-shelf interfaces products it offers, PPM's unqualified competence in the interfacing of IEEE instrumentation demands a mention here for the firm.

Q-Com Electronics Ltd.,
5th Floor,
St. Martins House,
10 Bull Ring,
Birmingham B5 5DT
Tel: 021-643 3540

MCH 23 IEEE-to-RS232 converter for printing at up to 300 bps (faster by special order). Addressable, correct upper and lower case, 20mA current loop option, and six months' warranty. £98.00

Qwerty Computer Services,
20 Worcester Road,
Newton Hall,
Durham
Tel: 0385-67045

Qwerty's impressive price list includes a £15.00 light pen which we haven't seen and a three-way IEEE or user port expander at £50.00. All the products listed here connect to the user port.
TV/Video interface: £31.50. Promises "very good" picture quality.



Soundbox: the well-established battery-operated user port sound effects interface for just £15.00
Combined TV/soundbox: the two units in one box for £45.00
Switch: a low-cost controller at £11.00 plus £5.00 per switch (£6.50 if you want mains switches).

GET YOU
ON V
THE PE

You've waited long enough to see Commodore's VIC 20, the most advanced home computer in the world.

Well, now's your chance.

VIC will be the star attraction at the Pet Show. So you can come along and see for yourself.

When it comes to computers, VIC really is the cat's whiskers.

18th June	9.30am – 1.00pm	Press and Trade only	
	1.00pm – 7.00pm	Public	
19th June	10.00am – 7.00pm	Public	Entrance fee
20th June	10.00am – 5.00pm	Public	for public: £1

The Pet Show, West Centre Hotel, 47, Lillie Road, London SW6.

UR PAWS
VIC AT
T SHOW.

commodore

Commodore Information Services, 818 Leigh Road, Slough, Berks. SL1 4BD

INTERFACES

• continued from page 34

Small Systems Engineering,
2-4 Canfield Place,
London NW6 3BT
Tel: 01-328 7145

Doyen of the interface makers, the biggest, and probably the best established - I can remember the 1978 amazement at 'Practical Computing' when we persuaded a Diablo to print PET listings via an original Small Systems Engineering interface.

The main SSE line today is now the newish GPI General-Purpose Interface. This is a programmable bidirectional and buffered interface that comes in a variety of guises. Buffering means you can attach fast devices for input: you also get to use the INPUT statement in BASIC, which is an easy way of handling the otherwise special connection. The GPI box contains an Intel 8085A, two 16-line parallel I/O ports of its own, and space for quite a lot of ROM and RAM. As well as the standard models currently available SSE intends this year to add versions for IBM-compatible bi-sync communications and one for packet-switched networks.

GPI-BCD: buffered parallel-BCD-to-IEEE interface, price £350.00

GPI-AP: buffered bidirectional IEEE/RS232 at £249.00, baud rates to 19200. Options include 20mA current loop at an extra £30.00

GPI-488: as above, but with SRQ and polling. SSE says this unit is compatible with the Tektronix GPIB and Hewlett-Packard HP-IB. Price £470.00

GPI-AN: a handy IEEE bus analyser, reporting events on the link as they occur by outputting plain English commentary on any RS232 printer or VDU. £450.00

GPI-SC; an IEEE controller which can be driven by any RS232 source - another microcomputer, a modem, terminals. £475.00

Type B200: bidirectional IEEE/RS232 serial interface with switchable code conversion and full RS232 handshaking. Soon to be upgraded as the 8048-based B300 with buffering and a communications bias, but in its current form it's £186.00

Type C: standard unidirectional serial interface typically to attach terminals like printer, VDUs, or Teletype. £120.00

TV/video interface: as described. A snip at £35.00

Ricoh RP1600 interface: the RP1600 is a fine daisywheel printer, spoilt a bit by the clumsy factory-fitted interface. SSE replaces it with a neater and cleverer board that can give you Centronics-compatible parallel, V24/RS232 serial, or GPIB/IEEE - you have to specify when ordering. Price £1,450.00. SSE says it will "shortly" have available an intelligent version of this interface to give functions similar to those on the Diablo 1640.

Stack Computer Services,
290-298 Derby Road,
Bootle,
Liverpool 20.
Tel: 051-933 5511

Stack is definitely one of the top Commodore dealers. It made its name among industrial and scientific users, and though the commercial side is growing for the company it still gets the bulk of its income from the technical business.

Petset 1: the Kingston/CmC 16-channel 8-bit A-to-D converter at £166.00

Adda 816: 16-channel 8-bit A-to-D. Quality spec includes signal preconditioning and a consequent price tag of £345.00

Adda 1016: 16-channel 10-bit A-to-D at £495.00. Clever numbering scheme this, isn't it?

Adda 8PA: 4-channel 8-bit D-to-A with 16x8 A-to-D. This is the 816 with D-to-A at a total price of £595.00

Adda 10PA: D-to-A with 16x10 A-to-D - the same treatment for the 1016 at £745.00

DAO4: 8-channel 8-bit D-to-A for £195.00. A more sophisticated version sells as DAO8 for £295.00

12DA4: 4-channel 12-bit D-to-A. £395.00

RIO8: 8-channel relay controller. £240.00

MRLO4: 4-channel mains switching unit. £389.00

IEEE to RS232: unidirectional at just £89.00, bidirectional for £140.00 - and a dual-ported version of the bidirectional interface is £175.00.

Stonefield Electronics,
Denne Parade,
Horsham,
West Sussex RH12 1DL
Tel: 0403-51366

Stonefield has been making industrial control and data acquisition systems for six years or so. Its interfaces look very professional, very solid, and very highly engineered: they are all based on the serial RS232 link, so for the PET Stonefield would have to supply an IEEE/RS232 converter as well.

10-channel digital input: AC or DC, nice and simple Klippon terminals, interrupt or 'line status' operation - price £305.00. There is the facility to attach one or two 20-channel extensions at £298.00 apiece, so 50 lines can plug into one port.

10-channel digital output, again with optional extenders : £346.00 for the master, £285.00 for each 10-channel slave.

4-digital 10-channel analogue input: models for voltage and/or current inputs, thermocouples, and thermometers - prices £983.00, £989.00, and £1050.00 respectively. 10-channel extender costs between £316.00 and £365.00

IEEE/RS232 converter: two ports for £275.00, four for £390.00

Taylor Wilson Systems,
Oakfield House,
Station Road,
Dorridge,
Solihull,
West Midlands B93 8HQ
Tel: 056 456 192

TWS is one of the top communicationns dealers, though for off-the-shelf interfaces it sells the same standard imports as several other sources.

ADA 1410: single-channel uni-directional IEEE/RS232 from CmC. £85.00

IEEE/parallel converter for Centronics and Anadex. This is the Aculab interface at £95.00.

TNW 2000 bidirectional IEEE/RS232 (recommended by TWS for up to 4800 baud). £160.00.

TNW 3000 for faster use (to 9600 baud). £265.00

The Superb S Series

Designed by
HONEYWELL

Professional Printers for Small Systems

Interfaces to:
Pet * Apple * TRS80
Horizon * LSI 11
PDP11 * NOVA

MBS Terminals

MBS Terminals Ltd., Aldwych House, Madeira Road,
West Byfleet, Surrey KT14 6BA Telephone: Byfleet (093 23) 52937
Suppliers of Computer Peripherals

SCREEN PROMPT MESSAGES

by Granville Kirkup

Almost any business or instructional program can benefit from the use of simple screen prompts, to let the user know what is happening now, what is needed next, or just to give a reminder of the type of format needed for a particular input.

The trick here is to keep the prompts short and to the point. To avoid distraction it's also a good idea to keep to a standard format - a reverse field bottom screen line is ideal, and if you can arrange for the reversed 'block' to be a standard length, no matter what the actual prompt wording is, so much the better. A user entering a screen of data may have the prompt line changing flick-flick-flick as he moves between the fields, but should not be distracted or aware of the prompt line unless he needs to refer to it.

This calls for a fast and easily used routine to print the prompt line. Using PR$ as our prompt message we can centralise the prompt by tabbing to column 20, less half the length of the prompt message. In its simplest form:

```
PRINT TAB(20-(LEN(PR$)/2))PR$;
```

To print this on the bottom screen line we can preface it with:

```
POKE 216,24: SYS 57949
```

So now we can return to our main program, right? Wrong. Unfortunately our cursor is now on the bottom line, so this is where the next INPUT or PRINT will be. To return to the screen line we were on before the prompt line was printed requires either a large number of cursor lefts and cursor ups, which will be different for every screen line, or we can store the previous screen line number by prefacing our routine with:

```
SL-PEEK(216)
```

At the end of the routine we can return the cursor to its original line width:

```
POKE216,SL:SYS 57949
```

However, the cursor will now be situated on whatever column position the screen prompt message finished, rather than the left hand (column 0) screen position. There are two methods of overcoming this; one is to POKE location 198 with '0' when returning the cursor to the required screen line, this will always return the cursor to the left hand screen position.

Alternatively, and more usefully, it's possible to store the screen column position the cursor was on before entering the prompt line subroutine. This will be '0' after a normal print, or a column number after a print followed by a semi-colon. This number can then be POKE'd back into location 198 to return the cursor to exactly where it was after the last PRINT.

So, our line to record the screen position now becomes:

```
SL-PEEK(216(:SC-PEEK(198)
```

and the line to reset the cursor to its former position now becomes:

```
POKE 216,SL:POKE 198,SC:SYS 57949
```

Similarly, if there's any chance of a 'print followed by semi-colon' immediately before the screen prompt routine, it's a good idea to POKE 198,0 to ensure that the prompt line starts from column'0' and not any other point, so the line to position the prompt becomes:

```
POKE 216,24:POKE198,0:SYS 57949
```

On old ROM PETs the locations are 245 (line), 226 (column) and SYS 58843.

Here's the full screen prompt sub-routine, and a short program to demonstrate it:

```
  1 REM**************************************
    **************************************
  2 REM
  3 REM
  4 REM
  5 REM**************************************
    **************************************
100 PRINT"{CLR}";
110 PRINT"PRINT POSITION HERE"
120 PR$="PRESS ONE KEY":GOSUB1000
130 GETGE$:IFGE$=""THEN130
140 PRINT"NOW PRINTING HERE"
150 PR$="PRESS ANOTHER":GOSUB1000
160 GETGE$:IFGE$=""THEN160
170 GOTO110
180 REM
190 REM
1000 REM
1010 SL=PEEK(216):SC=PEEK(198)
1020 POKE216,24:POKE198,0:SYS57949
1030 PRINTTAB(20-(LEN(PR$)/2))PR$;
1040 POKE216,SL:POKE198,SC:SYS57949
1050 RETURN
9999 REM**************************************
    **************************************
```

Don't tear your hair
Compufix is there!
Thatcham 67983

If your P.E.T. is having a nervous breakdown or your APPLE has bitten it's last byte. Then you need us!!
We are offering fast repairs to faulty systems, 24 & 48 hour maintenance contracts are also available.

COMPUFIX

THANK YOU

TO:COMMODORE U.K. LIMITED
COMPSOFT LIMITED
PRINTOUT MAGAZINE
SUMLOCK BONDAIN LIMITED
WEGO COMPUTERS LIMITED

For your kind hospitality during my recent visit to England. To those whom time prevented me from seeing, I apologise. However, if you feel you have a Commodore related product which could be marketed in Australia, please contact me. We are one of the leading Commodore Dealers based in Melbourne, Victoria.

NICKI SAUNDERS,
Director.

B.S. MICROCOMP,
4th Floor,
561 Bourke Street,
Melbourne,
Victoria, 3000
AUSTRALIA.

WHAT'S IT WORTH?

An investigation of Commodore's Approved Products Scheme

by Annabel Hunt and Dennis Jarrett

Any PET product carrying that little round blob and the impressive message about Commodore's "official stamp of approval" is Approved. So what, you may well be asking yourself, does this Great Seal actually mean? Who really benefits from the knowledge that Commodore approves? And does it make any difference if Commodore *doesn't* approve? What's it all about?

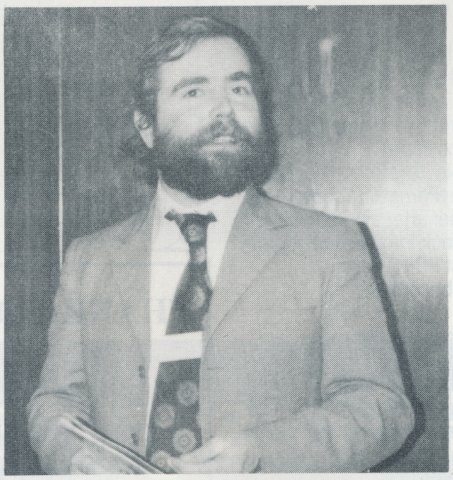
The Approved Products Scheme was introduced a couple of years back largely because of the way Commodore itself works. Commodore became a success (especially in Britain) by selling hardware for other people to program - shipping product, shifting *things* is still the basis of the company's operation. And that approach was fine for the original PET market, the home enthusiasts who enjoy writing programs and discovering machine code and playing with the user port.

But the appeal of the PET for business people was very strong; Commodore could hardly let that huge market pass it by. The trouble is, business users want a load-and-go system - they don't as a rule want to write programs themselves. And this posed a real problem for a company which, in the memorable words of one software house, "seems to think of software as an inconvenient little extra which had to be sold along with the hardware".

So Commodore did the obvious thing and commissioned various software houses to write appropriate packages to be sold as a complete systems with the PET under the Commodore label. ACT was one of the first choices: and yes, ACT would be interested - but only if the software products in question were to be marketed under the ACT name. Long meetings in smoke-filled rooms produced a compromise whereby ACT would write the software, Commodore would 'approve' it, Commodore dealers would sell it in conjunction with the hardware, and Commodore would include it in promotional material.

Commodore is "never a company to give something for nothing" (and why should they indeed?). So the deal was that it would charge a royalty percentage on all sales of the software for this assistance with marketing - much-needed assistance as far as some of Commodore's dealers and suppliers are concerned.

Meanwhile the Commodre Information Centre ("our function is *not* to give out information about Commodore products") was being "bombarded" with calls, according to amiable Andrew Goltz. Andrew's soi-disant 'Information Centre' was getting callers asking for information on where they could find extra products to supplement their PETs. These queries were a mite difficult to answer as the CIC had no complete listings of stocking dealers or products. And from that the late-departed Kit Spencer had the bright idea of extending the arrangement with ACT to other offerings. The hirsute Mr Goltz, now transmuted into further fame as VIC impressario for these isles, was given responsibility for the Approved Products Scheme from its inception. And through him CBM approached a number of people with apparently good products to see if they were interested.



In theory anyone with a decent PET product would go to Mr G. with it. If Commodore thought it could be improved in some way (i.e. if Andrew Goltz didn't like the look of it) the supplier would be advised. Otherwise it automatically appeared in the Approved Products Catalogue, a copy of which would go out with every PET sold.

The first catalogue arrived in Autumn 1979 and about the same time Commodore rented a room in a Heathrow hotel for its first ever dealers' show. All the Approved Suppliers who had signed up by then had their own first get-together with Andrew and his friends, as a result of which the deal was extended: at all future PET dealer shows they would be eligible for a discount ("admittedly very small") on stand space, and if their stands would be grouped together under the 'Approved' banner. A committee would also be formed to represent the APs in their dealings with Commodore.

How it works

Alas, the committee doesn't seem to have got off the ground. The other matters have been implemented, though.

For all this help with product development (advice on how best to present your problem, etc) and marketing (promotion to all dealers via the Catalogue), and to cover "administration costs", Commodore charges Approved Products suppliers a quarterly royalty on their sales.

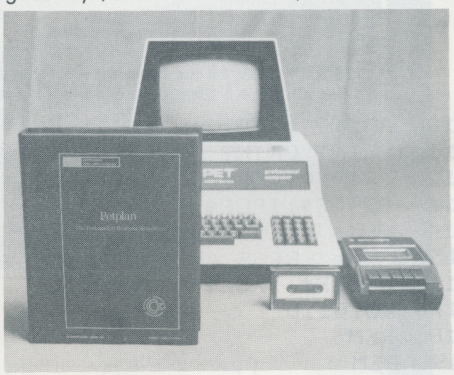
This is usually 5%. One does hear ugly rumours of a 7.5% charge but we haven't yet come across anyone paying this much - it might have been considered by Commodore in the early days simply because the smaller suppliers would never do enough business for anyone to get fat on a mere 5% of it. On the other hand, there are certainly some dealers who pay only 2.5%: they have a bit of extra clout with Commodore because they do a lot of business with the company, and 2.5% of their sales volume is really quite substantial.

Commodore swears it doesn't make a profit from the Approved Products Scheme - "the royalty is just for administration". But Derek Rowe, ex-Commodore software manager and in there at the start says that the whole exercise was thought up by Spencer purely as a revenue-earner "so that Commodore could take a decent cut from all the excellent things on the market for the PET".

The scheme has proved very successful and keeps Commodore very busy. So much so that Andrew Goltz (official title Marketing Manager, at the time) could not give it his full and undivided attention. A brand new full-time applications manager has been appointed. He is called Clive Booth, has a background in electronic engineering, came from BOC Datasolve, and started work on April Fool's Day.

He told us his first aim was to get his name about so that people knew who to contact about the Scheme (doubtless this piece will help him out - *Slough 74111*). Sounding extremely busy already, he told us that the Scheme currently numbers 38 royalty-paying suppliers and has a total of 50 approved products. There are nine more supposedly awaiting approval - though as it happens they are actually described in the current catalogue. Clive also has "a desk full of applications" and expects the catalogue to grow substantially.

So how does a product get passed? Well, in theory the applicant first gets in touch with Clive Booth with a detailed specification of how the product works and what it claims to be able to do. He has to think that it's of interest (a major hurdle? Not if you have any electronic engineering software to proffer, it seems). There also has to be no direct competitor already in the catalogue (that's changed since the early anything-goes days, of which more later).



As well as some virtue in the product itself, Commodore says it is looking for some evidence that the company will be around long enough to guarantee users some support. "If the applicant is for example a single programmer, he will be given an introduction to a recommended dealer so that they can come to some sort of mutual agreement". Or not, perhaps.

The product in question must have a minim-

um of three "mature" users so that Commodore can ask for their opinion. Surprisingly, that actually seems to happen - though in one or two cases the contact has been a bit perfunctory, to say the least. Commodore will probably look at the product itself for a technical assessment, though anything particularly complex might be sent to somebody who specialises in that particular field.

What's in it for the Vendors?

Among the lucky survivors in the Catalogue, opinions on the Scheme vary enormously. At one end of the scale there's the view of JCL, a small software house which cannot afford lots of expensive advertising. It finds that the appearance of its product in the catalogue means low-cost and affordable product promotion.

Besides, the Scheme enables such companies to pay for their product promotion *after* the sale has been made. Any other form of promotion requires payment in advance, which does nothing at all for your cash flow difficulties. So "the 5% royalty on sales is well worth it and the level of response is quite satisfactory" said JCL's Jackie Leman.

There's another supplier who is still in the catalogue and wishes to remain nameless. Now he reckons that the sales he has had have been "extremely limited" and not worth the 5%. However, he has remained in there because he finds the exhibitions tie-up very good indeed for business: he also likes the supplier meetings as a way of keeping abreast of developments. So it's worth his while to be in there - but not with all his products. Rather than pay 5% of his total turnover to Commodore he has bought some of the benefits while retaining the chance to spend on his own promotion.

We had a lot of requests for anonymity when researching this piece. Another nameless individual said that the approved suppliers sometimes get enough advance warning of new developments in the PET to give them time to amend their own products to match. He finds the scheme "a great help" - but he does a lot of his own promotion too, and he certainly doesn't rely on the catalogue for all his sales.

What's it like for Users?

In the early days of the Scheme - circa 1979 - criticisms were levelled at the care and attention given to product testing. It was all done in-house at Commodore and there are those who felt that it was not very thorough. The standard of programming also left much to be desired, it seems.

Well, we are happy to report that on both counts things seem to be much better now. Everyone from Goltz himself to the most disgruntled of the dealers we contacted said that the Approval process has tightened up considerably. On the other hand, it is not hard to find dealers who will say that the standards are still too low: but then they might be merely exhibiting their vested interests.

Even so it's clear that the Approved Products Catalogue is not without some faults. For a start, it certainly does contain some rather iffy products - and certainly several products that could be considerably improved, particularly as far as their general usability is concerned. Neatly sidestepping this land's estimable laws of libel in our search for examples, we would tactfully suggest that Compsoft's *DMS* file manager package for one is a fine piece of software with less than wonderful documentation.*

Second, the catalogue does not include all the products that it probably should - were it being presented as the last word on Commodore add-ons. It's not, of course. For instance, one of the best pieces of microcomputer software by any standards, *VisiCalc,* has only just made it into the list. The 'Approved Products' logo says no more than that the product is PET-compatible, and that it works. It is emphatically NOT a guarantee that CBM prefers it or that it is the best available product in its field.

But inevitably it must appear that way. And Commodore was more than a bit embarrassed at *VisiCalc's* absence. Anyhow, the keen-eyed will notice an anomally in Commodore's declared position - its policy now is to avoid competitive products in the same catalogue, but it assigns no superiority badges.

So where's Commodore's responsibility? Well, Andrew Goltz told us that even if an applicant does have an obviously superior product Commodore prefers to let an already approved supplier recoup his initial expenses before letting anyone else in.

Kobra, for one, probably has no complaints that *MUPET* is in and Taylor Wilson's *MPS* isn't. Now, we aren't saying which of the two multi-PET systems is better - and neither is Commodore. But the fact remains that any PET buyer can see that the one is 'approved' and t'other ain't. Clive Booth agrees Commodore is indeed in no position to make such God-like decisions: "something will have to be done about it". He didn't say what or when.

Anyhow, the current Catalogue does have a good deal of duplication, with similar products being offered for the same function at widely varying prices and with little indication of differentiation. Stage One's *PETAID* has to be considered as competition for Compsoft's *DMS; Wordpro 4* and *Wordcraft 80* are both there.

Some products which appeared in earlier catalogues have been dropped, or at least no longer appear. None of the people we spoke with had been omitted because their entry had been deemed inefficient, though. Tony Winter at GW Computers had a falling out with Commodore that was unrelated to the Approved Products Scheme and withdrew his business software; Zynar "changed marketing strategy" for the *Programmer's Toolkit.*

And then there are all those excellent PET-compatible products which are not in the approved scheme. Clive Booth reckons that he will be going out looking for specific entries if he feels that there is a gap in the catalogue. Meanwhile we polled several suppliers to find out why they weren't in there.

Peter Calver of Supersoft *(Presto Digitizer, Pic-Chip, Superchip)* is probably typical of one group. He thinks the Scheme is "terrific", but he doesn't feel that his customers would find it necessary to consult a catalogue for the kind of under-£50.00 products he sells. There's also an unspoken reluctance among the smaller suppliers to give away any of the tight profit margins on their low-cost products.

We spoke to some people with products that are at 'sensitive' stages of their existences. John Blackburn of B&B Computers, for instance, was generally enthusiastic about the Approved Products Scheme - it "really helps" when recommending products to customers, it's a "damn good marketing ploy", and "there are some intelligent people behind the scheme". At the same time he has two products of note which don't feature in it: his Prestel adapter, *The Bee,* will in these early days be marketed directly to dealers, but his *BBDOS* disk operating system he feels is getting near the end of its marketable life.

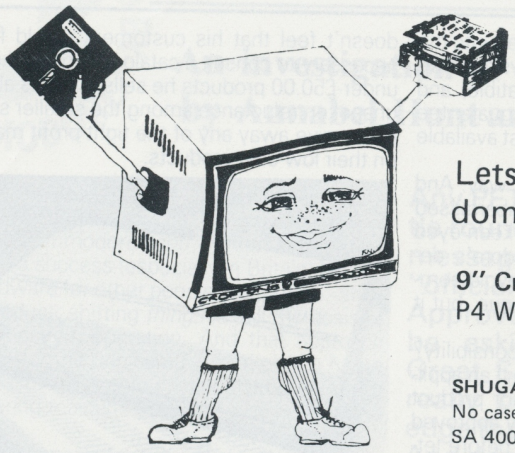
Many things seem to hinge on the relationship with Commodore and there is no apparent rhyme or reason as to which marketing option it will try for. Anagram's is a case in point. Anagram put its stock control package into an early Approved Products catalogue - having turned down an approach from Commodore whereby the product would be sold as a Commodore product.

In the event it got very little business from the cataogue and eventually decided that it would get more sales via the direct-selling route. So now Commodore sells Anagram software under its own label: and that way Anagram gets a royalty *from* Commodore rather than paying one *to* Commodore. HB Computers is another company whose packages are sold direct.

The fact that Commodore itself sells own-brand products that might compete with Approved Products - especially in terms of business software - does rankle with some suppliers, and it has certainly kept a few of them from applying to the Scheme. This is going to be a problem for Commodore from the business point of view anyhow, when Commodore will have to decide for itself on the relative profitability of own-branding someone else's products versus taking a royalty from Approved Products.

How to use the Approved Products Scheme

'With a pinch of salt' is the immediate answer. Bear in mind that the Approved Products Scheme is intended primarily to improve the image of the PET by publicising all the different applications and enhancements that might make you buy one. Secondly it's designed to provide some revenue for Commodore - all those 5% royalties. Thirdly, it's intended to help the suppliers market decent products and so become rich: and fourth, it's there to help the dealers by giving them something with a strong sales appeal that they can sell.



THE BODY OF ANY SYSTEM

Lets face it — you can't produce as crisp an image on a domestic T.V. as you can on a Crofton monitor.

9" Crofton Monitors
P4 White **£64.97**, P31 Green **£77.62**

SHUGART FLOPPY DISK DRIVES
No case, No Power Supply

SA 400	5¼"	S.S.S.D.	£149.05
SA 450	5¼"	D.S.S.D.	£283.31
SA 800	8"	S.S.S.D.	£340.52

FLOPPY DISKS — BOXES OF TEN

Single sided	35/40 Track		£ 26.45
Double sided	35/40 Track	5¼"	£ 37.95
Single sided	77 Track		£ 41.40
Double sided	77 Track	5¼"	£ 47.15
Single sided		8"	£ 40.25

IKEGAMI 12" MONITORS

P 4 White	£171.50
P31 Green	£184.97

2/3" FULLY INTERLACED C.C.T.V. CAMERAS £149.00

ALL THE ABOVE PRICES INCLUDE V.A.T. AND CARRIAGE

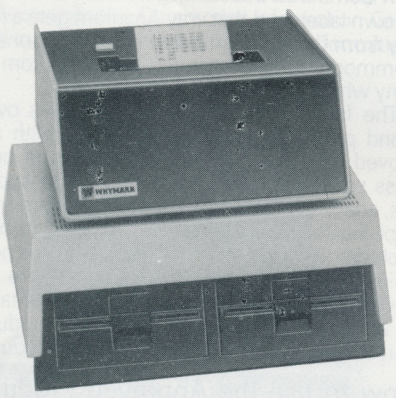
ALL MAJOR CREDIT CARDS ACCEPTED — Small surcharge

BARCLAYCARD

Buy it with Access

CROFTON ELECTRONICS LIMITED

35 Grosvenor Road, Twickenham, Middx. TW1 4AD. 01-891 1923/1513



POINT OF SALE - - STOCK CONTROL

*Control of stock, orders and deliveries

*Handles 15,000 product lines

*VAT calculation and analysis

*Security control of access to data and till

*Automatic recovery from power failure

*Complete documented Audit Trail

*Prints customer receipt and copy

*Full daily cash and sales report

*Handles variety of payment methods

*Cash, card, account, cheque, split tender

*Instant stock data display

*Summary of sales by assistant, by department

*Full cash control

*Refund, Void, No Sale, Petty cash controls

*Multiple linked systems available

WHYMARK INSTRUMENTS LTD.
6 HOLMESDALE ROAD, REIGATE, SURREY, RH2 OBQ (07372) 21753

The benefits the user gets out of the Scheme come a long way down the list. In theory, though, the Approved Products Scheme should provide some guarantee of quality - and an important avenue of redress. In other words, you can complain if they don't work as advertised.

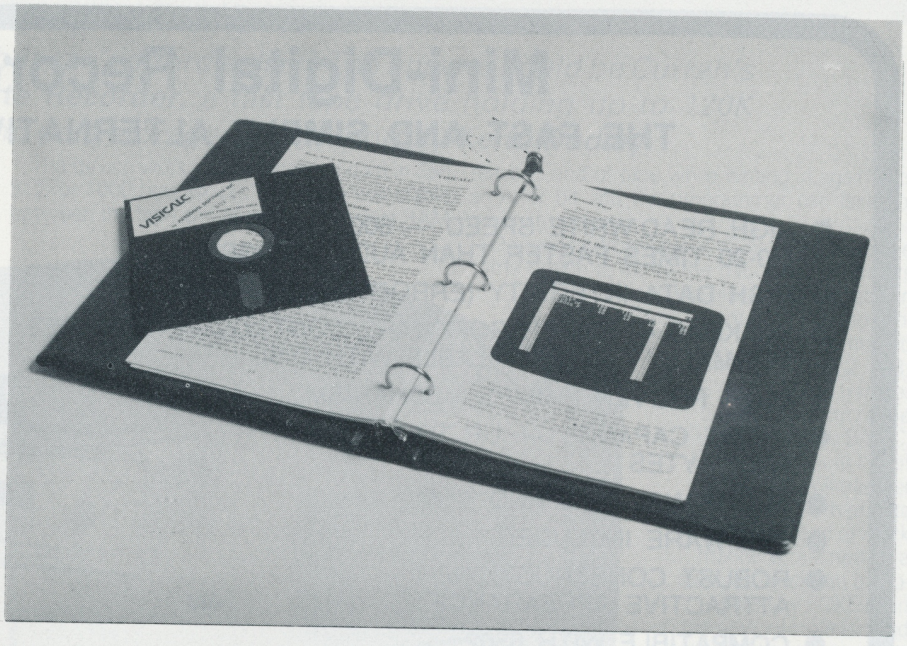
In fact you probably have the right in law anyhow, though the legal profession will have a lot of fun running rings around you with concepts like 'fitness for purpose' and 'reasonable claims'. Being able to moan directly to Commodore should simplify things and might even get something done.

If you disagree with the inclusion of any of the products in the catalogue you will obviously tell Commodore. We spoke to one dealer who said that there were a couple of items in it which he considered "rather below standard" (he wouldn't say what) - but then he admitted that he hadn't bothered to complain to anyone, he'd just avoided using and selling them himself.

Commodore told us that there have only been six major complaints in the past 18 months. For the rest, everyone receiving copies of the catalogue has presumably agreed with its assessments.

The Scheme is praised by dealers for providing answers to the more unusual applications - a dealer usually has his own ideas on the straightforward business packages but sometimes it would have taken a long time to search out the rarities. That's exactly how the end-users should treat the Scheme, in our view. A quite unusual and highly specific package like Taylor-Wilson's *Telexprep* has deservedly done well out of the Scheme, and the Catalogue has provided a way of locating this kind of product very easily.

As a final word, here are a couple of PET dealers with interesting comments. First Amplicon's Peter Wood: "as a dealer I go to the Catalogue as my first resort if it's an unusual application we're looking at - but I certainly realise it has limitations. As an Approved Products supplier, I love it: it gives me exposure to a wide audience on a very economical basis".



And here's Cliff Wyatt at Penmark Precision Instruments: "we do give the Approved Products Catalogue to customers freely - but we certainly wouldn't recommend everything on it."

**See review in this issue. Compsoft say they are rewriting the manual - Ed.*

Circle Software

QUALITY SOFTWARE FOR YOUR PET

Touch Typing Course

A complete course of 3 lessons to teach you touch typing. Features fully adaptive lessons giving help and guidance, and fun to do.

KEYBOARD TUTOR 1. Basic Course	£12.00
KEYBOARD TUTOR 2. Advanced Course	£12.00
KEYBOARD TUTOR 3. Fast keypad training	£ 9.00
COMPLETE COURSE on one cassette	£29.95

Useful Utilities

COMPACT This useful program when APPENDED to any working BASIC program will reduce it to its smallest size, by concatenating lines and removing blanks and REMs. Up to 25% space saving. £ 9.50

DISASSEMBLER. Will disassemble any memory area into symbolic code, to screen or printer; a must for 'hackers'. £ 9.95

Games

DEMOLITION Fast action for one player	£ 4.95
MASTERMIND Break the code. Good presentation	£ 4.95
TOWER OF HANOI With impressive demonstration	£ 4.95
BATTLESHIPS Good graphics, traditional game	£ 4.95
HANGMAN (and why not!)	£ 3.95

Any three games for £12.00

Send S.A.E. (10 x 7) for our latest catalogue of PET software, or your cheque for the above amounts to:-

33 RESTROP VIEW, PURTON, WILTS SN5 9DG

BUSINESS ELECTRONICS

'The Microcomputer Specialists'

The South's leading Distributor for Commodore, Apple II ITT 2020 and all related products.

AND NOW Commercial Systems Dealers for CBM Series 8000

We believe in SUPPORT for all our users.

We stock	We also provide
EQUIPMENT	ADVICE
PARTS	PROGRAMMING
SOFTWARE	REPAIRS
SUPPLIES	EXCHANGES

from all leading suppliers.

We have over 40 years' accumulated experience in Computers, Electronic Engineering and Systems.

We can supply all the proven hardware and software accessories for your PET, APPLE and ITT . . . call us NOW!

Discounts for C.W.O., Educational Establishments and cash purchase.

Call us on Southampton (0703) 738248.

Business Electronics

Rownhams House, Rownhams, Southampton, Hants

Mini-Digital Recorder

THE FAST AND SIMPLE ALTERNATIVE TO DISC

- HIGH READ/WRITE SPEED — 6000 BAUD (10-20 TIMES FASTER THAN AUDIO CASSETTE)
- HIGH DATA INTEGRITY (ERROR BETTER THAN $1:10^7$)
- NO KEYS — UNDER SOFTWARE CONTROL — FACILITIES NORMALLY ONLY AVAILABLE WITH DISC
- USES PROVEN PHILIPS MECHANISM
- LARGE CAPACITY — UP TO 120K BYTES
- ADDITIONAL RAM AND ROM
- FIRMWARE INCLUDED
- ROBUST CONSTRUCTION/ ATTRACTIVE APPEARANCE
- COMPATIBLE WITH 6502 BASED COMPUTERS INCLUDING PET, AIM 65, KIM, OHIO, COMPUKIT, ETC

£195.00 + £2.75 p.p. + VAT

ALSO AVAILABLE (Prices Excluding VAT)

		£
TAPE CASSETTES (BOXES OF SIX)		15.90
MDCR 220 MECHANISM		83.00
INTERFACE BOARD (1MHz)	FOR	42.50
MEMORY BOARD WITH FIRMWARE)	MDCR 220	45.00

CURRAH COMPUTER COMPONENTS

SANDGATE INDUSTRIAL ESTATE,
HARTLEPOOL, CLEVELAND, TS25 1UB
TELEPHONE: (0429) 72996

PETALECT. An all-round computer service.

PETALECT COMPUTERS of Woking, Surrey have the experience and expert capability in all aspects of today's micro-computer systems and word processors; providing users, first time or otherwise, with the Service and After Sales support they need.

COMPUTER REPAIRS AND SERVICE

If you're located within 50 miles of Surrey, PETALECT can offer FAST, RELIABLE Servicing with their own team of highly qualified engineers.

24 hour maintenance contracts available. Our service contracts start at around only **10%** of your hardware cost per annum for on-site, or if you bring it to us at our own service dept., it costs only **£25** plus parts. Representing real value for money.

MICRO COMPUTER SUPPLIES

PETALECT can supply the great majority of essential microcomputer-related products promptly and at really competitive prices. Such items as:—

TAPES●PAPER●FLOPPY DISKS●PROGRAMMES FOR BUSINESS●SCIENTIFIC OR RECREATIONAL APPLICATIONS●MANUALS●COMPUTER TABLES●DUST COVERS RIBBONS●TOOL KITS●PRINTERS●ELECTRONIC INTERFACES WHICH ARE PETALECT'S SPECIALITY.

If you want to find out more ring us on 04862 69032 or come along to **STAND 17** at the 'PET' show.

We're worth getting in touch with.

SHOWROOM
32, Chertsey Road, Woking, Surrey

PETALECT
MICROCOMPUTERS

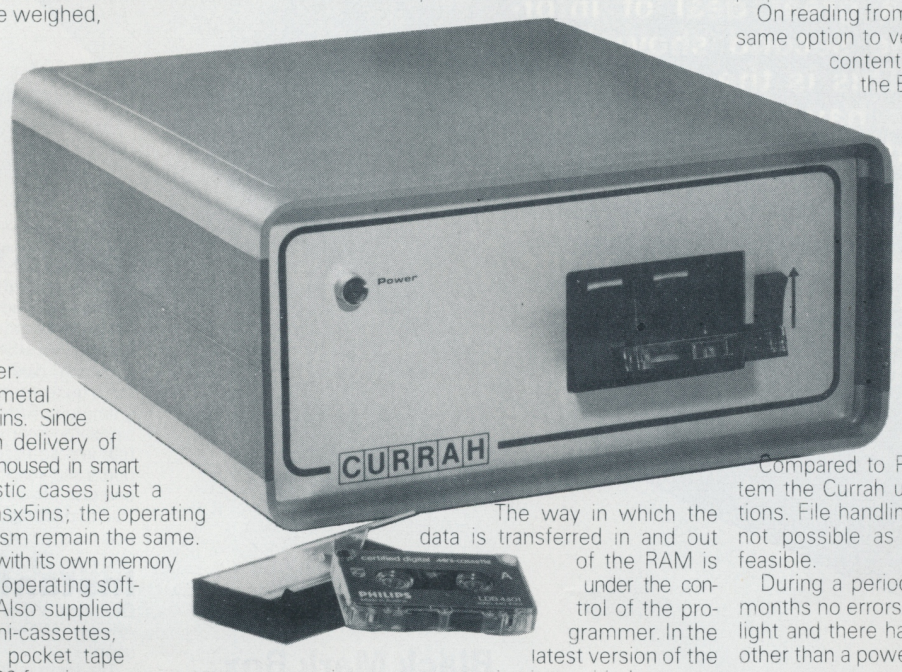
SERVICE DEPT.
33/35 Portugal Road, Woking, Surrey

Mini Digital Cassette Recorder

Cassettes too slow but can't afford a disk? The answer could be Currah's ***Mini Digital Cassette Recorder,*** *a fast tape drive holding up to 120K bytes of program and data storage. User report by* ***Keith Dudley.***

About a year ago I had to install a semi-auto mated dye weighing system in one of our works. This involved the transfer of information about what was to be weighed, and in what quantities, from one PET system to another. It very soon become apparent that the slow, and occasionally unreliable Commodore cassette was not up to the job.

We placed an order with Currah for their Mini Digital Cassette Recorder. The first two units arrived in December. These were in black metal boxes - 8insx6insx4.5ins. Since then we have taken delivery of two more - this time housed in smart two-tone beige plastic cases just a little larger - 8insx8insx5ins; the operating system and mechanism remain the same.



The system comes with its own memory board with RAM and operating software held in ROM. Also supplied is a manual. The mini-cassettes, familiar to users of pocket tape recorders, cost £15.90 for six.

The units we have are running on four different types of PET, ranging from an original 8K model 2001 up to the current CBM 4032. The 2001 option simply plugs into the memory expansion port. To connect the others it is necessary to open up the PET case and connect a plug into the right hand ROM socket and a further one to a memory expansion connector.

The first thing one notices is that there are no controls - not even an on/off switch! All the functions of the tape deck are software controlled. The system isn't quite as simple to use as the standard cassette, but one soon picks up the procedures. The major advantage is speed - just under 800 characters per second.

To load a program all you have to do is place the cassette in the tape deck, type SYS 40010, and the unit automatically rewinds to the beginning of the tape and loads the first program on the tape. Repeating the command loads the next program. The command to save a program is SYS 40000 - SYS 40035 on the 2000 series. Named program files are not yet supplied by the operating system, but are perfectly feasible.

The device works by transferring data in 256, 512, or 1000 byte blocks (software selectable) between the tape and an internal block of RAM.

The way in which the data is transferred in and out of the RAM is under the control of the programmer. In the latest version of the operating system a routine is provided to transfer data from the buffer into a string variable, using CHR$(13) as a data separator.

Here is how we actually use it. First - writing data to the cassette. This is done by transferring a word of data byte by byte into the cassette RAM using the statement FOR J = 1 TO LEN(A$): POKE SA+J:ASC(MID$(A$,J,1):NEXT, then POKE SA+J(13) then recalculate SA as the start address of the next word. When the data block is full the data is written to tape with a SYS39200. SA is then reset to the Start Address of the cassette RAM. I also use a character to indicate there there is another block to follow, or to indicate End Of File.

On writing to tape the unit checks that there is indeed a cassette in the tape deck and that the write enable plug is present in the tape. If either of these tests fail then an error bit is set in memory location 38901. After a Write it is possible to verify that the data on tape corresponds with that in RAM by executing a SYS39600; a verify error sets an error bit in 389091; if an error *is* detected it is possible to backspace with SYS39923 and rewrite the block. If the unit reaches end of tape while writing, it again sets an error bit and the programmer can take appropriate action.

On reading from tape (SYS39400) there is the same option to verify the data before using its contents. If the first simple variable in the BASIC program is a string variable, then the command POKE 1, 0:POKE 2, 148: SYS40048 will transfer the first data out of the tape buffer into BASIC. Each subsequent call of SYS40048 will transfer a further item of data until the end of block marker is reached. The data in a block can be updated by POKEing in the new information and the backspacing and rewriting in the original location.

Compared to PET's cassette operating system the Currah unit does suffer certain limitations. File handling by means of named files is not possible as yet but again is technically feasible.

During a period of operation of some three months no errors of data transfer have come to light and there have been no hardware faults - other than a power-on indicator bulb blown.

Conclusion

The speed - just under 800cps - and reliability of data transfer make the units ideal for applications involving serial data transfer. The block read and write capabilities could form the basis for an inexpensive business system where the cost of a disk was deemed too high. A further use could be to provide a safe transaction journal and backup system for disk based systems.

Currah's system represents a significant advance over the audio units currently being supplied. The under-£200 price tag represents good value.

Full details are available from Currah Components, Sandgate Industrial Estate, Hartlepool, Cleveland. Tel: 0429-72996.

Typesetting

Why settle for scruffy typed manuals when you could you could just as easily typeset them ? The low cost high quality answer is an IBM Electronic Composer. That is how *Printout* has been set for the past six months. Now we happen to have a spare IBM that's less than a year old, and lightly used at that. It is yours for less than £5000 with eight typefaces, paper and accessories.

Interested ? Call Wendy Cheetham on **0635 201131** but hurry!

The Daily Telegraph,

I get some sharply critical letters from time to time but my readers are happily less demonstrative than those who subscribe to the British computer journal PRINTOUT. *Its columnist's mail bag recently has included several hate letters, two death threats and a dead rat.*

PETERBOROUGH

THE COMMODORE

Anyone who attended the first PET Show last year in the Cafe Royal will undoubtedly remember it as a source of much fun and a great deal of information. Now the second show is almost upon us. This is the one opportunity PET users have to view in one place all the add-ons and applications for their favourite micro. To encourage you to make the trip to the West Centre Hotel, London at the times opposite, PRINTOUT has managed to obtain advance information on most of the more startling products to be exhibited.

Silicon in the Office

When the OZZ information retrieval package first appeared last year, its new approach to layout and user-friendliness caused quite a stir in the micro business.

Now its authors - **Bristol Software Factory** - have taken the original concept much further by making OZZ the central unit of a much larger suite, dubbed **Silicon Office.** As well as information retrieval, the "office" contains a full-blown word processor capable of generating multi-column text, and communications handlers for sending files, formats and complete documents to other PETs over the phone.

The bad news is that to run all these features you are going to need the new 8096 HyperPET with 96K of RAM, and an 8010 modem. That's because **Silicon Office** contains no less than 44K of machine language - or sosme 20,000 lines of source code! Existing OZZ users will be interested to learn that the **Silicon Office** allows files to be mixed and merged with much more advanced analysis capabilities - and that there is a utility for converting existing OZZ files.

Traitor's Module

Devoted PET and 6502 addicts rarely miss an opportunity to prosletize our favourite processor. So the very mention of other CPUs like the Z80 is liable to start a long and tedious argument about addressing modes and similar esoterica.

Unicorn Software Ltd. have now done the same for PET - a Z80 module which supports CP/M version 2.2 and hence COBOL, FORTRAN and the excellent **Wordstar** word processor.

Plenty of Scope

Microcomputers work digitally - representing every value or number as a string of 1's or 0's. Unfortunately, this becomes a major problem when trying to link the micro to devices in the "real world" where quantities are inconveniently represented in analogue form. The need to convert between the two has resulted in a large number of A to D and D to A converters now available for PET.

Ortholog Ltd. make some rather startling claims about their version, however: 8 channels of input or output voltage, with sampling rates of 60,000 measurements per second. This, they say, coupled with suitable software can convert PET into a speech processor, spectrum analyser or datalogger. But add a simple oscilloscope on the back and you can simulate one of those fancy 'storage scopes' which keep and process the signals shown - and normally cost thousands of pounds.

So, if you are a super-duper electronics engineer or merely want to play Space Invaders on your scope - this is for you.

Black Mark Box

You're going to need one of those soft black pencils to use **Wego Computers** proudest product - the **Mark Sense Card Reader** for PET. In case this brings back dread memories of Multiple Choice exams at school, let us assure you that these cards can also be used for market research, bit patterns for Eprom programming, or even filling in your football pools.

Illusions Shattered

Communications, it seems, is the name of the game these days and **Davidson Richards Ltd.** will be one of the contestants at the PET Show.

If, like us, you thought that micro-computers were supposed to be free-standing local units, then you will have this illusion shattered if you watch their Communications Controller turn PET into an intelligent mainframe terminal.

While you are puzzling that one out, **Davidson Richards** say they will also have a low cost colour printer on show. Exactly how low the cost will be, you - and we - will have to wait and see.

Chips of the Blue Kind

A hushed silence falls upon the **Printout** office as we learn that a genuine "Blue Chip" company will be in our midst at the PET Show.

ICI - the people who brought you the Old English Dulux Dog - actually use quite a lot of PETs, and reportedly have their own User Group. The Petrochemicals and Plastics Division will be displaying their internally-developed Gammatrol Interface system, a single master with lots of slaves *[sounds like the Printout offices - Ed]*.

There seemed to be some confusion from the press release as to whether this unit is used for Chemical Process Control or the hourly tea-brewing process which occurs in ICI's North-of-England Billingham Plant. Either way, it's got to be an improvement on our office *Teas Maid.*

MOUSY

Technofor GmbH of Germany must be serious contenders for the most awful Acronym Award with their Monitor Utility System, MOUSY.

Having said that, the specification looks quite impressive with EPROM programmers, RAMs that imitate EPROMs, simulated interrupts, and all those other features so essential to software developers and so incomprehensible to everyone else. If you develop machine code, a visit to this stand should be on your itinerary.

Instant ROM

Question: When is a ROM not a ROM? Answer: When it can be altered by the user!

The Instant ROM from **Greenwich Instruments Ltd.** is one of those really clever ideas that surfaces from time to time, occasionally. It is a small device which plugs into one of PET's ROM expansion sockets and provides 4K of non-volatile memory. What that means is that though you can read and write to the memory as normal, the contents are not lost when you switch the power off. A tiny battery (topped up each time you use the PET) can preserve the data for months. *See Hotline for further details.*

Swedish Affairs!

The Swedes have a certain reputation for forward thinking - particularly in the computer field. Commodore's representative in Sweden - **Datatronic AB** was recently voted Swedish Computer Company of the Year.

They will be at the PET Show to demonstrate their FORTH package, and a new multi user system with a priority control. Printout staffers are hoping they will be sending their special all-female contingent.

You Never Had It So Good

If you think your PET setup is complete, you had better check out the **International Data Automation Ltd.** stand.

They supply special furniture for using PET in the business environment. Adjustable height tables with palm rest, disk frames, printer and paper trolleys - you name it they've got it.

And for the sceptics who believe that if it hasn't got chips in it, it isn't a real computer product, **IDA** now handle the Kurta Graphic Input Tablet. And that has got lots of them.

And that is not all. The company also supply wipes, wands and solutions for cleaning your PET. So if you've just finished a particularly heavy de-bugging session and your screen is fogged by smoke, coffee and blood stains, you can pick up your spring cleaning supplies here.

PET SHOW

Naturally, the most exciting stand will be the PRINTOUT stand where even Inside Trader has promised to put in an appearance - in cognito, of course! We look forward to seeing you there. Times are as follows:

Thursday 18th June
1.00p.m. to 7.00p.m.

Friday 19th June
10.00a.m. to 7.00p.m.

Saturday 20th June
10.00a.m. to 5.00p.m.

In the Background

The PET word processing program **Wordcraft** from **Dataview Ltd.** can surely be said to be very much in the foreground of things, and we shall be taking a close look at it in the next issue. Certainly it has developed considerably in both specification and performance since its launch eighteen months ago.

Wordcraft is best known for the way in which the document being typed appears on the screen in the same form as it will on paper. The newest feature, however, is called Background Printing, whereby one document is printed, and another one edited simultaneously!

Wordcraft author Pete Dowson has achieved this by getting the disk to talk direct to the printer without going through the PET! If that doesn't strike you as clever, try and work out how it is done.

Professional Gambling

Playing the stock market to win is a game strictly for the experts and the very rich. But those whose business involves the buying and selling of shares won't need to be reminded of the importance of up-to-date and accurate information on share performance. **Micro Facilities Ltd.** are showing a **Portfolio Management System** that does just that.

Safety First

For those with hex appeal, a company called **Microhex Computers** will be showing no less than four EPROM programmers - ranging in price from £40 to £300. We don't doubt they will also be able to furnish you with an equally impressive range of reasons why the latter model is worth so much more than the former.

Not content with hardware alone **Microhex** are also demonstrating some interesting new software packages: TILL-STOCK for point of sale application; "STUDY ONE" for cash flow analysis; and "MICROSAFE" - a program and disk security system.

That will do nicely

Whatever your feelings about computerized hotel bills, they do seem to leave less scope for error and creative surcharging. Specialists in this field are **Landsler Software**, who have a new version especially designed for restaurants. Service compris, no doubt.

Scizophrenia

Adda probably wouldn't be flattered to have their PET Show presence so described. But in fact it is not inappropriate. Firstly their stand is shared with sister company **Medicom.** Secondly, their principal product, **MUPET** works by deceiving a single disk drive into thinking it is really eight drives, and so capable of servicing up to eight PETs. And finally, Patrick Dixon will be demonstrating their medical diagnostic programs. Scizophrenia - no laughing matter really - was one of several possible diagnoses of Gavin Sanders many ills. Personally, we think a bad case of hypochondria more likely.

Confetti Machine

Remember paper tape? That nasty white stuff that used to spew out of teletype machines and cover the floor with the confetti from the punched holes? Well, it still has its uses - particularly in machine tooling where the electrical environment is too harsh for magnetic tape and disk. **Taylor-Wilson Systems Ltd.** designed their **Tapeprep** program for PET to help edit and produce paper tapes.

Recent improvements to **Tapeprep** have been in the field of real-time debugging, so that when your milling machine produces the worlds first square wheel, you can point straight to the bug in your program!

Keyboards Out, Ballpoints In!

Often one of the major psychological barriers to computerising a system is the keyboard and screen. It may be the confusing array of keys and symbols, an inability to type, or in the case of some managers, the feeling that 'typing' is beneath their status. But until recently, more natural forms of data entry were no more than a dream.

The **Micropad** allows handwritten data to be fed directly to a computer as it is written. The pressure sensitive surface is covered by a standard sheet such as a stock card or telex form, and the user simply writes on this with a ballpoint pen. Although limited mainly to capitals and numerals on a 32x16 grid, when PRINTOUT tested the system, we found it easy to use and tolerant of different styles of handwriting.

A single line display provides verification of the entered characters and allows corrections to be made. Characters are transmitted via the RS232 to the host computer.

Micropad is one of several communications products shown by specialists **Cortex Computer Systems Ltd.**

C.C. The Chairman

Telex was one of the really great inventions. For the first time you could leave messages for people who were out; be abusive without fear of retaliation; and c.c. the Chairman for good effect! What isn't so much fun for the telex operator is being interrupted every two minutes by an incoming message.

Petelex shown by **MicroComputation** uses PET and a high speed tape punch to prepare telexes off-line at high speed and with powerful word processor type editing facilities.

It's all Greek to us!

If you use your PET for scientific purposes and enjoy unscrambling formulae full of theta's, gammas, delta's and the odd Epsilon, then the latest innovation from **Avon Computer Rentals** will be a welcome sight: a PET that speaks Greek!

More accurately, the Alpha Plus chip allows PET's screen to display any one of four different character fonts, instantly selectable at the "flick of a switch". Numbers 1 and 2 are the conventional upper/lower case and graphics sets, but with the welcome addition of the £ sign in both - and not before time.

Third one is for mathematical notation with Greek letters as well as symbols for Set Notation. The final option conjures up images of Computer Aided Design with Intergalactic Warfare thrown in: described as "graphics only", it contains symbols for resistors, capacitors, tanks, helicopters and spaceships. Zapp!!!

Spaced Out

There are now so many plug-in ROM chips that finding space for them all is a real problem **JCL Software** sell several such chips including the **Business ROMs** reviewed in this issue. Happily, they have done something about the space problem. The **ROM Pager** accepts up to eight ROMs, allowing you to select between them with a simple POKE instruction. We will be reviewing it shortly but you can see it for yourself on the JCL stand.

Compiled Basic

Intex Datalog are one of the three companies now offering some form of Basic Compiler. Using Basic programs already saved on disk, it converts them to machine code - maximum length 28K - and re-saves them on disk - ready for execution as machine code. Intex say their PC-Basic Compiler is fully compatible with Commodore Basic.

Tapes and Disks

Half inch magnetic tape and 24Mbyte hard disks have largely been the domain of mini computer systems up to now. **S.E. Labs Ltd.** of the Thorn-EMI group, however, will be showing both on their stand, complete with IEEE interfaces.

While the cost is likely to be high, the advantage of magentic tape is the ability to back-up disks, or transport data physically to other locations.

At the time of going to press, final details on all the stands were not available, but the following snippets should be enough to whet your appetite:

Reliable technical programs for engineers and scientists from **TECPAC Software Centre**.....Integrated Sales, Purchases, Nominal and VAT System from **M.M.S. Ltd.**.....Outside Services Management software from **L & J Computers**.....Integrated Ledger complete with Cash Flow forecasting from **Bartholomew Business Systems Ltd.**.....Specialist interfaces for the weighing industry from **Petalect Ltd.**.....IEEE Analogue Input module from **MC Computers Ltd.**.....BCD, A/D, TTL, IEEE, 8CH 12BIT, all this and more in interfaces from **3D Digital Design & Management**.....Magazines and more magazines from **ECC Publications**.....Integrated accounting with 9 invoice types from **Merchant Systems Ltd.**.....NETKIT and other clever communications ideas from **Kingston Computers**.....Office Mate - full business system with modem link from **Micro Computer Centre**..... Version 6 of Petaid with local and global maths from **Stage One Computers.**

STAGE ONE COMPUTERS

PETAID VERSION 6
NEW & COMPILED
The Total Information System and New TRANSACTION PROCESSOR

Petaid Version 6 is now available, all the previous powerful features PLUS transaction processing with Mathematics, both Local and Global PLUS it is compiled which means it runs in machine code at up to **20** times its speed in BASIC.

It allows the creation of Master Files and related transaction files, both to a free format and both with Mathematics.

Other facilities supported are complete 8050 disk spanning if required, searching, sorting, indexing, listing to user defined formats, existing database format and content amendment, history file creation, common record names if required, multivolume files, bidirectional link with Wordcraft and link with VisiCalc.

Petaid Version 6 *£300+VAT*
with Wordcraft Link *£300+VAT*

GENERAL ACCOUNTING PACKAGE New Compiled 8000 PETs

The only truly integrated open Item Sales Purchase and Nominal System NOW compiled which means it runs up to **20** times faster.

It provides for user defined Account Number ranges and a choice of either a single or multi disk system dependent on ledger volumes.

The user can select to establish Sales and Nominal or Purchase and Nominal or Sales Purchase and Nominal.

The system also provides for automatic postings to Goods and VAT accounts, Sales Control, Purchase Control, Cash Account, Discounts (given and received), full Audit Trails, Aged Balances, Trial Balance, automatic and screen cleardown of matched transactions, monthly balances of control accounts (for 12 months), Account Mailing, Index Printing, Payments lists, mixed posting in a batch or strict batch posting, due payments list (sales and purchases by individual transaction) on account payments, Sales, Purchase, Nominal Statements, screen statements on all ledgers, Systems Managers transactions, VAT calculations for "inclusive" amounts to "exclusive", analysed transactions, service industry "costs" invoicing, fee invoicing (if required), cash transactions. All sequences of processing are controlled by the computer.

G.A.P. *£800+VAT*

Versions for 3000 and 4000 series PETs also.

INCOMPLETE RECORDS New Compiled 3000 & 4000 PETs

The most flexible system available, unlimited transactions facility for up to 2300 Nominal Codes now compiled and therefore up to **20** times faster.

User defined Account Numbers and Report Formats, Trading Account, Profit and Loss Account, Balance Sheet and Schedules etc. to cater for every type of business.

Full audit trails in Day Book and Sorted Account Number order, speedy posting routine allows for optional descriptions up to 25 characters, new accounts may be set up during posting, Final Account formats may be transferred from client to client and modified if required.

Other facilities include Trial Balance at any time on rounded or actual depreciation calculations, VAT calculations forwards or backwards, memo accounts, facilities for operating statements etc., year end cleardown, full control exercised by the system.

Incomplete Records System *£800+VAT*

8000 Series version to be available.

ALSO Systems for INSURANCE BROKERS, ESTATE AGENTS, STOCK CONTROL, MAILING, CLUB RECORDS, ETC.

6 Criterion Arcade,
Old Christchurch Road,
Bournemouth. **Tel: 295395**

TOMMY'S TIPS

Missing Bytes

If I turn my 8K PET 2001-8 back on within a short time of using it, the screen message reads 5997 BYTES FREE, instead of the normal 7167 BYTES FREE. What is wrong?

K.E. Owens

A poorly RAM chip, I would say, Mr Owen. There is a lot of it about. If you open up the PET - unplug it first - you will see two rows of eight rectangular chips at the front of the board; these are the RAMs. It will be one of the ones in column seven, counting from the right. How do I know? From the number of bytes free. If there were less than 1023 the dud would be in column two; between 1024 and 2047, column three; 2048 to 3071, column four; 3072 to 4095, column five; 4096 to 5119, column six; 5120 to 6143, column seven; 6144 to 7166, column eight. If one of the RAMs in the right hand is duff, you won't get any screen message at all.

At this stage you may want to go PET in hand to your nearest Commodore dealer. However, if you have nerves of steel, and preferably some experience of removing chips, you can narrow the search still further. Unplug the PET again, and with a thin blade remove both chips in the suspect column (No. 7 in your case). Be sure they come straight up to avoid bending their weedy little legs. Now swap 'em round and gently push 'em back in.

Switch on again. If you now have even fewer bytes free than before the dud RAM is the one in the bottom row, nearest you. If the number increases, it is the chip you put into the top socket. Remove the culprit and replace it with one of the RAMs from column eight on the left. You will only have 6143 bytes free to play with, until a replacement arrives, but at least they will all be good ones.

Remember that the notches on the RAMs should be nearest you.

Test for Shift

Is there any way to test whether the shift key is being pressed?

Geoff Sissons

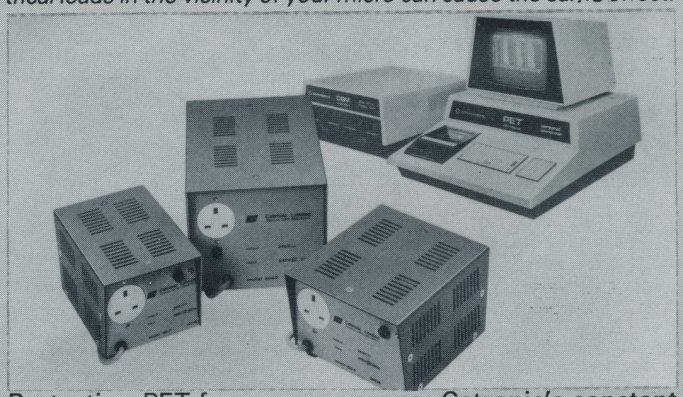
Take a PEEK at location 152, Geoff. It normally contains a 0, but while shift is being pressed that changes to a 1 for the duration. Ditto with shift lock. In hexadecimal notation the address is $98, and it is the same on all PETs. Your line should start: IF PEEK(152)=1THEN.....

Crash Preventor

Your report on Disk Corruption (April) was really useful, but it still doesn't explain why my whole system crashes at lunchtime every day.

Wim Keisler

*What happens at lunchtime every day? Thousands of electrical devices are turned off all over the country and thousands of cookers turned on. My guess - and you haven't given me much to work on - is that your problems are being caused by high voltage spikes in the electricity supply. The lovely Ilona Uhl had exactly this problem up at Baroness International, Commodore's P.R. company. When eventually they tumbled the cause of it, the Electricity Board hired (yes, **hired!**) them a meter to test the supply. Sure enough a massive spike was coming down the line every lunch time. Heavy electrical loads in the vicinity of your micro can cause the same effect.*



Protecting PET from power surge: Cetronic's constant voltage transformer.

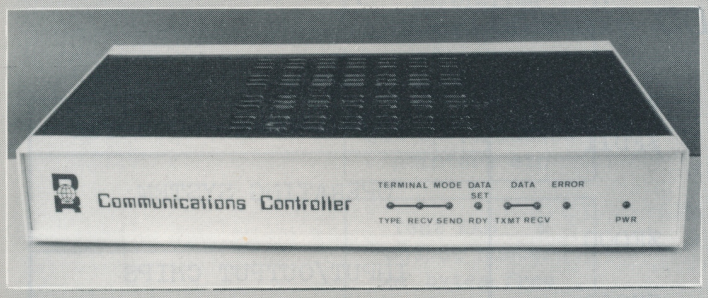
We call 'em "transients". Switching on photocopiers can also cause them. The fix is a constant voltage transformer. Contact Cetronic on 0920-871077 for details. Logic Box have a cheaper device costing £40; ring 01-222 5492

PET to Mainframe

Mention was made in Hotline of a PET-to-mainframe interface. Does this mean that the PET can emulate all the facilities of a video terminal?

D.P. Bingley

Yes Sir. That's Davidson-Richards' latest gizmo you're talking about. It's a combined/hardware software package that allows a PET to be connected to a BIG computer. It does indeed emulate a full facility terminal, complete with addressable cursor, format control and protected fields. There are also facilities for screen hard copy print and mainframe controlled loading and running of PET programs. I am hoping to use one to set up the world's biggest Startrek program on ACT's ICL2900 mainframe.



£995 buys you this communications box, which plugs into the user port, and the software to control it ***and*** *PET, when it is running in communications mode. Output is via an RS232C interface, so you can communicate with the big computer by direct line or telephone modem. The lads at D.R. tell me that several such stations can share a line. Call them on Derby (0332) 366803 for more info.*

Using GET

I know how to use the INPUT statement, but simply cannot get the hang of GET. Please help.

Roger T. Methuen

INPUT is like telling a porter to bring all the luggage he finds on the platform. GET is an instruction to fetch just one piece. Its purpose is to accept a single character from the keyboard. It does this by burning down to the keyboard buffer, grabbing the first character in the line, and storing it in the variable specified. GETA stores the number of the key pressed in variable A.

The normal rules apply; attempting to store an alphabetic character in a simple variable is verboten. So if you respond to GETA by pressing Y, you will be zapped with the ?SYNTAX ERROR you richly deserve. Programmers expecting an alphabetic reply would use GETB$, or GETZ$ or whatever turns them on.

I herein lies a minor complication. If no keys have been pressed the keyboard contains not nothing (isn't that a SYNTAX ERROR? - Ed) *but a row of null strings or "" "s. GET accepts null strings and will quite happily congratulate itself on having got a character when none has been pressed. The solution is to put in an extra program line to weed out the null strings:*

```
100 PRINT"PRESS ANY KEY TO CONTINUE"
110 GETA$
120 IFA$+"" "GOTO110
```

This routine will happily loop round and round until you press a key. If line 120 weren't there, it wouldn't even pause for breath. Incidentally, lines 110 and 120 are more usually compressed into:

```
110 GETA$:IFA$+"" "GOTO 110
```

GET will equally happily accept return and store its value, CHR$(13), in the variable.

Useful command GET, once you get the hang of it.

SuperPET Window

I am told I can create a window in my SuperPET's display. How is it done?

K-J Nillson

Very easily, K-J (is that the Scandinavian equivalent of J.R. perchance?). All you gotta do is move the cursor to the bottom right and top left hand corners of where you want the window to be, and execute the SET BOTTOM function, which is CHR$(143), followed by SET TOP which is CHR$(15). Try this:

```
100 PRINT"homedowndown";TAB(30);CHR$(15);"downdowndown";TAB(50);CHR$(143)
```

If you have copied it in right, and the printers haven't goofed, it should create a window from columns 30 to 50 in width, and rows 2 to 5 in depth. To get rid of it again PRINT the 'Home' character twice.

In the Red

A gloomy afternoon contemplating my personal cash flow situation. After much computing the results range from pale pink (July) to Soviet red (December). I shall consult the Editor about a rise. *(Out of the question - Ed).* Reader Michael Stevens of Buntingford, Herts obviously has similar preoccupations. Here is a routine he has written that displays monthly expenditure against a projected yearly budgetted total. Lines 10 to 170 merely set up the monthly spends in his example; you would put in your own figures. The calling program resides between lines 1000 and 1030. The subroutine at line 5000 draws the axes, whilst the one at 5100 plots the monthly amounts. Lines 1050 and 1060 lose the cursor.

```
10 DIM TM(12): REM TM() EQUALS MONTHLY ACCUMULATED TOTALS
20 TL=600000: REM SET TL EQUAL TO CASH LIMIT IN PENCE
25 :
30 REM SET TM() AMOUNTS IN PENCE
40 TM(1)=35000
50 TM(2)=80000
60 TM(3)=115000
70 TM(4)=155000
80 TM(5)=195000
90 TM(6)=260000
100 TM(7)=295000
110 TM(8)=345000
120 TM(9)=410000
130 TM(10)=445000
140 TM(11)=500000
150 TM(12)=515000
160 CA$(0)="OVERALL TOTAL"
170 UN$="————————"
180 :
1000 GOSUB5000
1010 FORM=1TO12
1020 K=TM(M)/TL*18:GOSUB5100
1030 NEXT
1040 :
1050 PRINT"■";
1060 GETA$:IFA$=""GOTO1060
1070 :
5000 PRINT"■";:FORI=1TO22
5003 IFI=1THENPRINT:NEXT
5005 IFI=2THENPRINT"    |          ";CA$(H):NEXT
5006 IFI=3THENPRINT"    |          ";UN$:NEXT
5010 IFI=5THENPRINT"100%| TOTAL=";TL/100:NEXT
5020 IFI=14THENPRINT" 50%|":NEXT
5030 PRINT"    |":NEXT
5040 PRINT"  0%L";:FORI=5TO39:PRINT"_";:NEXT
5050 PRINT"      A M J J A S O N D J F M";
5060 FORI=33613TO33005STEP-38
5070 POKEI,100:POKEI+1,67:NEXT:POKE32967,100
5080 RETURN
5090 :
5100 J=33691+M*3
5105 IFK<0THENK=0
5110 N=INT(K):J=J-40
5120 IFN>0THENK=K-1:POKEJ,160:GOTO5110
5130 K=K*8:ONKGOTO5141,5142,5143,5144,5145,5146,5147
5140 RETURN
5141 POKEJ,100:RETURN
5142 POKEJ,111:RETURN
5143 POKEJ,121:RETURN
5144 POKEJ,098:RETURN
5145 POKEJ,248:RETURN
5146 POKEJ,247:RETURN
5147 POKEJ,227:RETURN
```

Scientific Notation

Working with larger numbers occasionally becomes too much for my PET which then produces results like 1.22E+9. Why is this?

Micky O'Rorke

That thar is scientific notation, a convenient shorthand used to express very large or very small numbers. 1.22E+9 is the same as 1,220,000,000 but rather easier to say. Counting all those zeros would certainly knacker me (what ***were*** *you doing to achieve such a result?)*

Any number can be represented in scientific notation. The form is a number called the coefficient, which can be integer, fraction or combination of both, containing the significant digits; followed by E, which is short for "exponent". Next is an optional plus or minus sign, then a one-or-two-digit exponent to indicate the number of places to the right (or left, if negative) the decimal point should be moved.

PET uses scientific notation for numbers smaller than 0.01 or greater than 999,999,999. But there are limits and BASIC can't handle a floating point number larger than -1.70141183E-38 without generating an Overflow Error. Anything smaller than -2.93873588E-39 comes up as a zero. Type ?2.93873587E-39 for the number of fan letters Gavin Sanders received last week.

HOW BAS

What goes on inside the PET? Since its first appearance three and a half years ago, various of the facilities buried inside the ROMs have been documented. But until now there has never been any comprehensive explanation of how PET goes about its business. MIKE TODD explains.

It was difficult to decide at what level to aim this article, and I have attempted to keep it fairly simple (and consequently omit a lot of detail - for which I apologise in advance). The only requirement is that the reader understand the principles of machine code programming and have some knowledge of simple terminology such as RAM, byte, stack, hex notation and so on. All references to machine details will refer to BASIC 2 (sometimes called level II or new ROM BASIC) and conversion tables for BASIC 1 (level I or old ROM BASIC) can be found in a variety of publications. BASIC 4 (disk BASIC) is available in two forms - one for the 40 column machine (BASIC 4.40) and one for the 80 column machine (BASIC 4.80); however, this article will only make occasional reference to this particular BASIC.

The Inside Story

The first consideration must be to sort out the organisation of the massive amount of software in the ROMs of the PET. There are three main divisions:

1) **The Operating System** - is the section of ROM dealing with cassette, keyboard, screen and IEEE input or output. It is written specifically to match the hardware configuration of the PET.

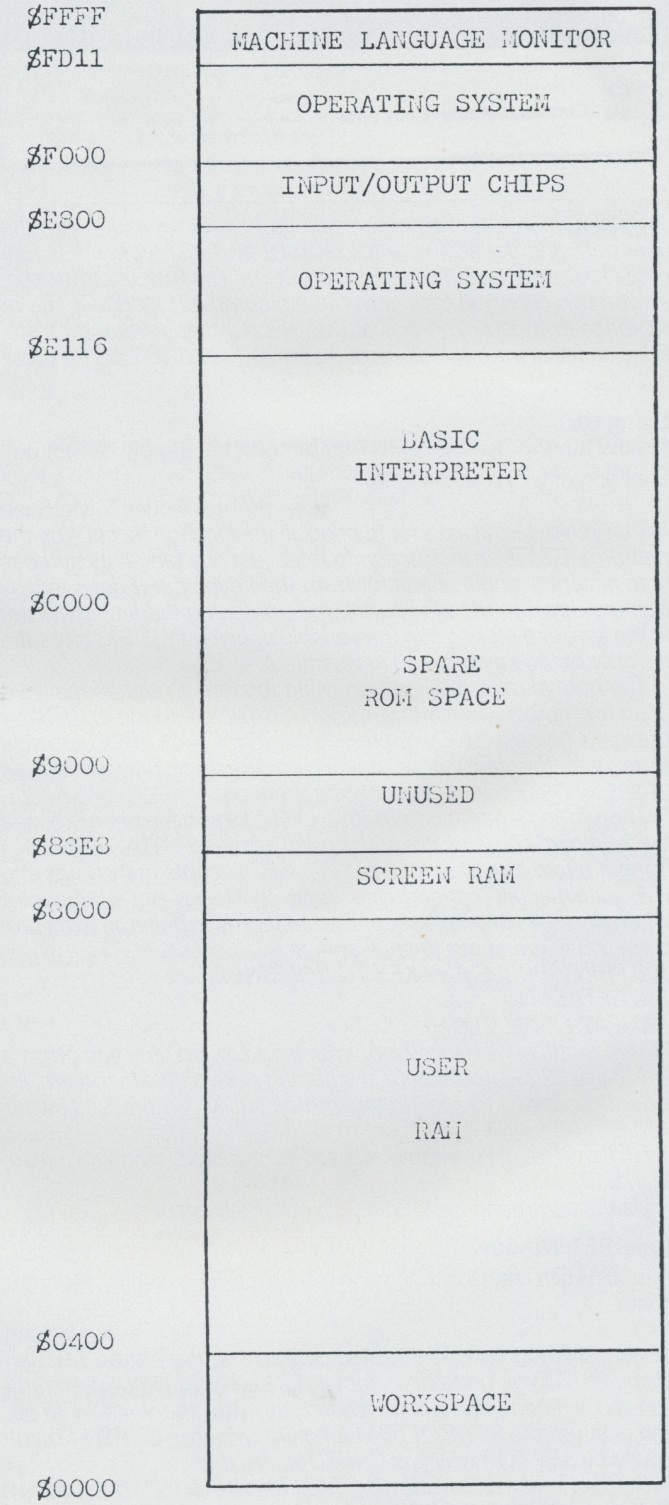
2) **The BASIC Interpreter** - written by Microsoft, this is the program which allows you to write lines of program, edit them, and excecute them. It was originally written in general terms for use by different computers and is customised by Commodore for use on the PET - using the PET operating system for input and output. In fact, most of the interpreter is identical to that in other machines such as the APPLE.

3) **The Machine Language Monitor** - although not really part of the normal operation of the PET, this program (accessible by SYS64785 or SYS1024) provides facilities for manipulating machine code programs using hex codes and for saving and loading machine language programs from disk or tape. On BASIC 1 PETs, this is replaced by diagnostic routines which are of very limited use to most PET owners.

At the heart of the PET is the 6502 microprocessor which at switch-on starts to execute the ROM software at an address placed at the end of ROM ($FFFC/D). This routine initialises all registers, input/output chips, BASIC pointers and vectors (a vector is an address held in RAM for future use and which indicates the entry point of a routine held somewhere in memory). It clears the screen and checks RAM by writing a number into every location and confirming that it is read back correctly. It does this twice for every location and as soon as it detects an error it assumes that it has run out of RAM and sets the end of RAM pointer accordingly. The greeting message is printed using this information to indicate the number of bytes free. Then the READY message is printed, the cursor is flashed and a holding loop is entered waiting for you to type something.

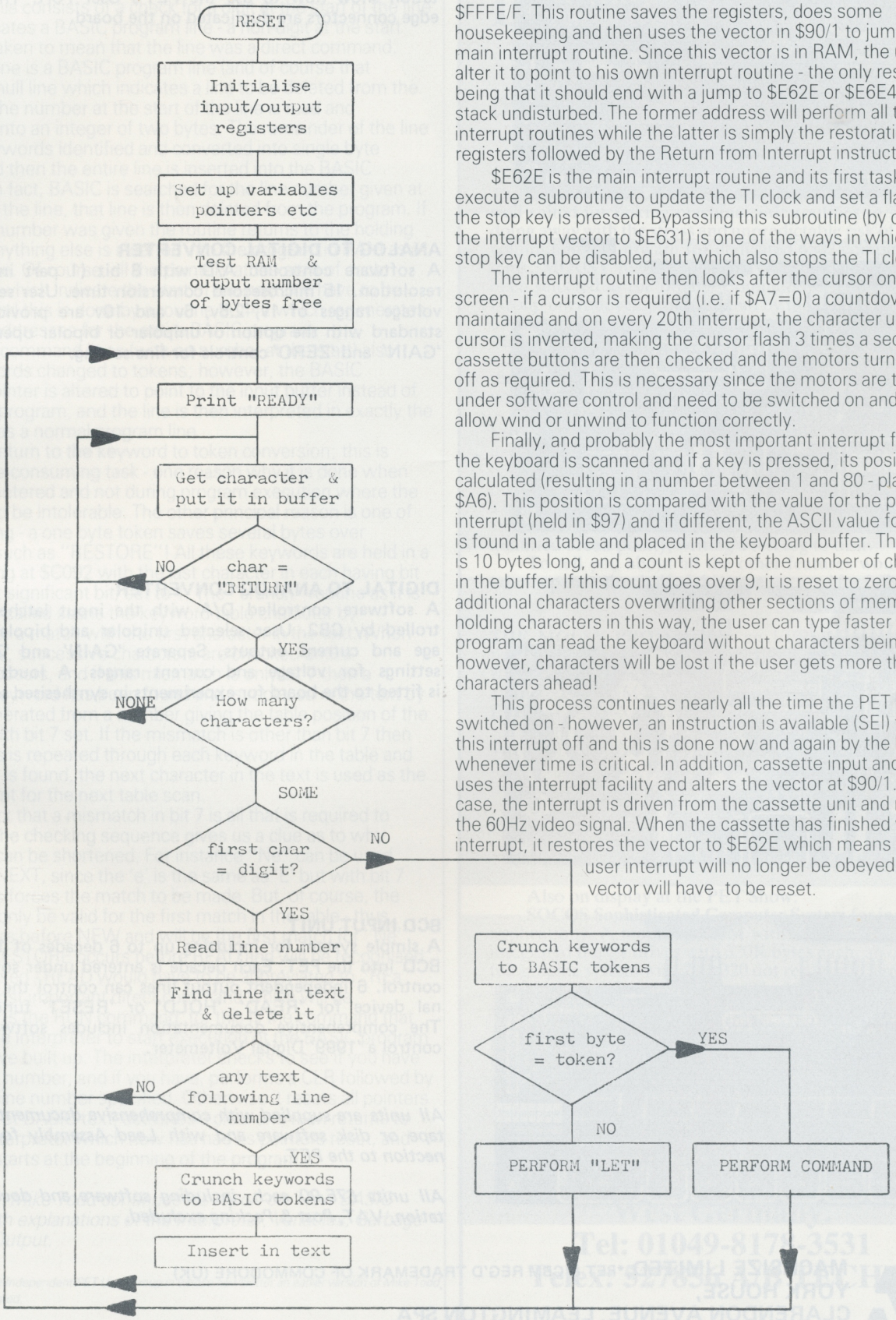
Interrupts

While waiting, the 6502 is far from idle. Every 1/60th of a second, a pulse is generated (from the video circuitry) and fed to the Interrupt Request pin (IRQ). When the pulse is received, the 6502 stops whatever it is doing, saves the status register and return address and starts executing code at the address given in



A simple memory map of PET.

SIC WORKS



What happens when you switch on.

$FFFE/F. This routine saves the registers, does some housekeeping and then uses the vector in $90/1 to jump to the main interrupt routine. Since this vector is in RAM, the user can alter it to point to his own interrupt routine - the only restriction being that it should end with a jump to $E62E or $E6E4 with the stack undisturbed. The former address will perform all the usual interrupt routines while the latter is simply the restoration of registers followed by the Return from Interrupt instruction (RTI).

$E62E is the main interrupt routine and its first task is to execute a subroutine to update the TI clock and set a flag ($9B) if the stop key is pressed. Bypassing this subroutine (by changing the interrupt vector to $E631) is one of the ways in which the stop key can be disabled, but which also stops the TI clock.

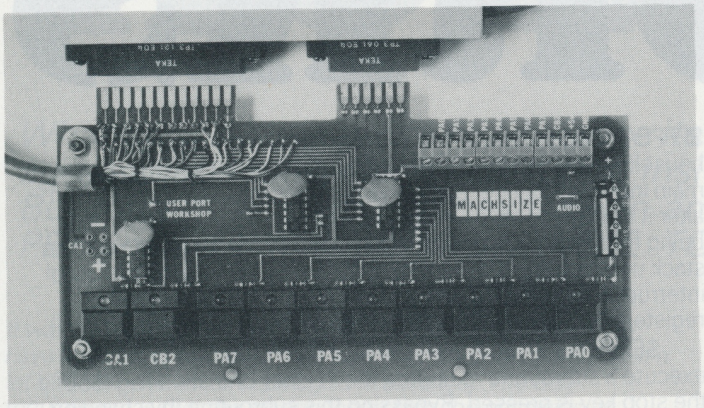
The interrupt routine then looks after the cursor on the screen - if a cursor is required (i.e. if $A7=0) a countdown is maintained and on every 20th interrupt, the character under the cursor is inverted, making the cursor flash 3 times a second. The cassette buttons are then checked and the motors turned on or off as required. This is necessary since the motors are totally under software control and need to be switched on and off to allow wind or unwind to function correctly.

Finally, and probably the most important interrupt function, the keyboard is scanned and if a key is pressed, its position calculated (resulting in a number between 1 and 80 - placed in $A6). This position is compared with the value for the previous interrupt (held in $97) and if different, the ASCII value for the key is found in a table and placed in the keyboard buffer. This buffer is 10 bytes long, and a count is kept of the number of characters in the buffer. If this count goes over 9, it is reset to zero to avoid additional characters overwriting other sections of memory. By holding characters in this way, the user can type faster than the program can read the keyboard without characters being lost - however, characters will be lost if the user gets more than 9 characters ahead!

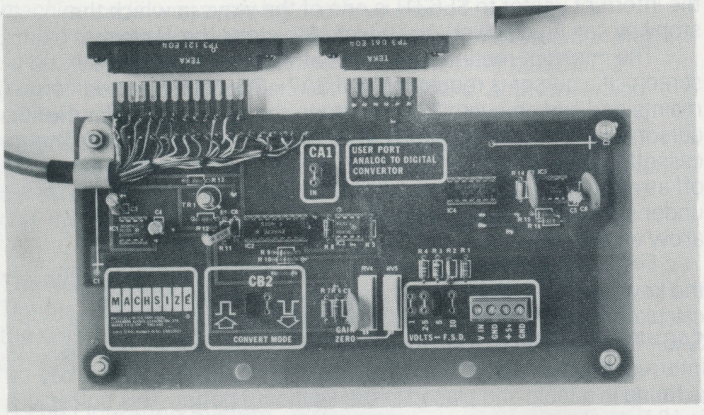
This process continues nearly all the time the PET is switched on - however, an instruction is available (SEI) to turn this interrupt off and this is done now and again by the PET whenever time is critical. In addition, cassette input and output uses the interrupt facility and alters the vector at $90/1. In this case, the interrupt is driven from the cassette unit and not from the 60Hz video signal. When the cassette has finished with the interrupt, it restores the vector to $E62E which means that any user interrupt will no longer be obeyed and the vector will have to be reset.

continued

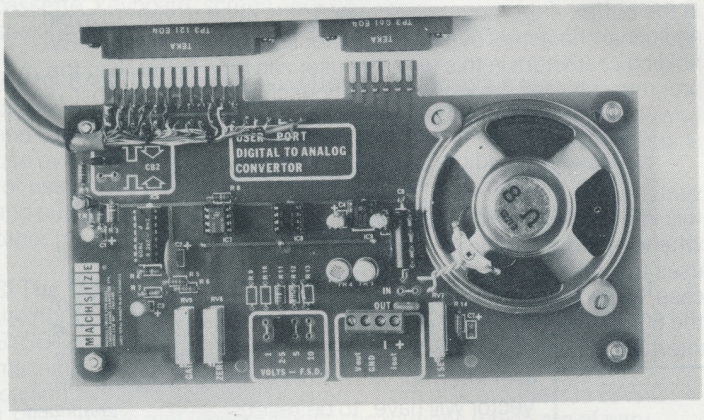
USER PORT INTERFACING FOR PET



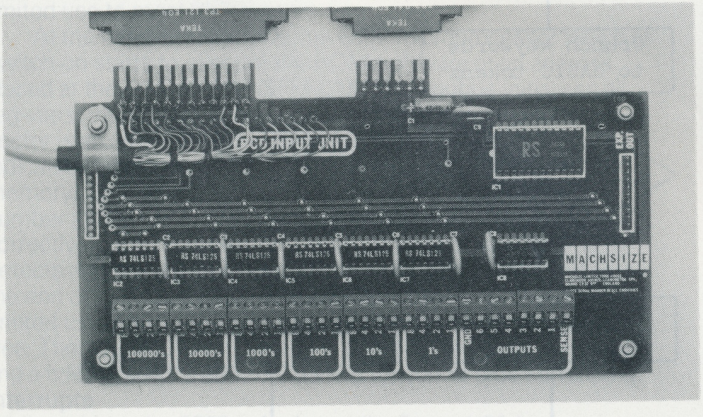
USER PORT WORKSHOP
Eight switches and eight LED indicators are fitted for the Data Lines. CA1 and CB2 have debounced switches and LED's to show the state. 10 programs and full documentation show how to use the PET's User Port. The PET edge connectors are duplicated on the board.



ANALOG TO DIGITAL CONVERTER
A software controlled A/D with 8 bit (1 part in 256) resolution. 15 microsecond conversion time. User selected voltage ranges of 1v, 2.5v, 5v and 10v are provided as standard with the option of unipolar or bipolar operation. 'GAIN' and 'ZERO' controls for fine setting.



DIGITAL TO ANALOG CONVERTER
A software controlled D/A with the input latches controlled by CB2. User selected unipolar and bipolar voltage and current outputs. Separate 'GAIN' and 'ZERO' settings for voltage and current ranges. A loudspeaker is fitted to the board for experiments in synthesised sounds.



BCD INPUT UNIT
A simple system for inputting up to 6 decades of 1-2-4-8 BCD into the PET. Each decade is entered under software control. 6 independent output lines can control the external device for 'READ', 'HOLD' or 'RESET' functions. The comprehensive documentation includes software to control a '1999' Digital Voltemeter.

All units are supplied with comprehensive documentation, tape or disk software and with Lead Assembly for connection to the PET.

All units £75.00 each, including software and documentation. VAT, Post & Packing excluded.

MACHSIZE LIMITED, *PET & CBM REG'D TRADEMARK OF COMMODORE (UK)
YORK HOUSE,
CLARENDON AVENUE, LEAMINGTON SPA,
TELEPHONE (0926) 312542/32399 TELEX 312376

continued

HOW BASIC WORKS

Ready and Waiting

Armed with this information we can now rejoin the main holding loop just after READY has been printed out. In fact, we are at address $C392. The first thing that to be done is to accept characters from the keyboard (more precisely, from the keyboard buffer) and print them to the screen along with a flashing cursor. When you press the RETURN key, the characters on the screen are read one at a time (by the subroutine $FFCF) and placed in an 80 character input buffer for analysis. This consists of a check for a digit at the start of the line which indicates a BASIC program line - a non-digit at the start would be taken to mean that the line was a direct command.

If the line is a BASIC program line (and of course that includes a null line which indicates a line to be deleted from the program), the number at the start of the line is read and converted into an integer of two bytes. The remainder of the line has the keywords identified and converted into single byte tokens, and then the entire line is inserted into the BASIC program. In fact, BASIC is searched for the line number given at the start of the line, that line is then deleted from the program. If only a line number was given the routine returns to the holding loop, but anything else is inserted into the program in RAM as a program line. Of course, all the pointers at the start of each BASIC line which indicate the start of the next line have to be adjusted, and this is done by a routine $C442 which regenerates these link addresses for the entire BASIC program.

Direct command lines (with no number at the start) also have keywords changed to tokens; however, the BASIC program pointer is altered to point to the input buffer instead of the BASIC program, and the line is then interpreted in exactly the same way as a normal program line.

Let's return to the keyword to token conversion; this is quite a time-consuming task - one reason why it is done when the line is entered and not during program execution where the delay would be intolerable. The other principal reason is one of space saving - a one byte token saves several bytes over keywords such as "RESTORE"! All these keywords are held in a table starting at $C092 with the last character in each having bit 7 (the most significant bit) set to 1. The "crunch" routine as it is sometimes called scans the keyword table character by character for a match with the first character in the text. When this is found, successive characters are checked until a mismatch occurs, and if this mismatch is only bit 7 then a complete keyword has been found and is replaced in the text by a token generated from a number giving the table position of the keyword with bit 7 set. If the mismatch is other than bit 7 then the process is repeated through each keyword in the table and if no match is found, the next character in the text is used as the starting point for the next table scan.

The fact that a mismatch in bit 7 is all that is required to terminate the checking sequence gives us a clue as to why keywords can be shortened. For instance "Ne" can be used instead of NEXT, since the 'e' is the same as 'E' but with bit 7 set and this forces the match to be made. But, of course, the match will only be valid for the first match in the table - thus, NEXT occurs before NEW and will be the first match for "Ne". Similarly, RESTORE occurs before READ and will be recognised if "Re" is used - READ would have to be abbreviated to "REa".

The most important direct command which will be interpreted is the RUN command, for this is the command that instructs the interpreter to start execution of the BASIC program that you have built up. The interpreter checks to see if you have given a line number, and if you have, performs a CLR followed by GOTO the line number specified. Otherwise it resets all pointers to the start of BASIC text, activates a clear and then returns to the main interpreter which now has had its pointers reset, and execution starts at the beginning of the program.

Next month Mike Todd continues his report on 'How BASIC Works', with explanations of the Interpreter, Variables, Garbage and Input/Output.

Our thanks to the Independent PET User Group in whose newsletter an earlier version of Mike Todd article first appeared.

At last there is a new

MACHINE CODE SOFTWARE DEVELOPMENT SYSTEM

that services all your needs at low cost!

The CBM Monitor Utility System - MOUSY®is equally well suited for linking machine code routines to BASIC, doing away with the stress and unpredictable risk of writing volumuninous software for dedicated 6502 computer systems. **MOUSY** has been extensively tested and has now been selected as the official Commodore semi-conductor Group microdevelopment system by the originators of the 6502, MOS Technology Inc. That fact alone should persuade you to send for full information. Or call us in Germany - it costs less than you think. Or come and see us at the PET Show. We will be especially interested to talk to you if you are a dealer.

MOUSY is a lsystem made up of carefully matched components. The MOUSY module goes into the $9 and $A spaces. It contains 8K of ROM and 2 pages of RAM giving you over thirty commands for machine code handling. There is a unique execute system that allows the testing of programs step-by-step or automatically usingg the KILL condition (a qualified break point), writing a test log to disk.

To tell you about all the other features would have taken up the other half of this page, so send for full details.

THE MOUSY PROMMER is an EPROM programmer that connects to the user port; it reads, burns and verifies ROMs up to the new 28 pin 8K types. EPROMs can also be emulated by RAMs being loaded and used exactly like and EPROM.

We also offer a fast easy-to-use **Disk Assembler.** It is a three pass system, barely occupying your RAM, as it can be completely overwritten at the third pass.

For those who work with our Assembler we have a powerful 2K **Soft File Editor** which links into BASIC.

And a lot more.

Also on display at the PET Show:

SOCOS Sophisticated Computer System for industrial applications. A modified CBM with enhanced O.S., two integrated floppy drives with 320K bytes each, an optional full graphic system with 200x320 dot resolution and a Tektronix compatible command set. The IEEE capabilities are also improved.

SEPIO Universal Low Cost Industrial Interface System for analog and digital applications. It is easy to handle with a special set of additional BASIC commands supplied on a ROM.

Contact us for details.

TECHNOFOR GmbH.
D-8026 Ebenhausen,
West Germany.
Tel: 01049-8178-3531
Telex: 527856 A/B TECH-D

DMS, from Compsoft, stands for Data Management System. As you'd expect, it's the software for a database. But does it have features to set it apart from the others? We check and report.

In previous reviews of different database systems, we've begun by briefly describing the concept of a database. Hopefully, experienced users and other old-timers will excuse us if, for the newer people, we summarise quickly once more.

'Database' has become the computer-world term for a collection of bits of information, each of which is related to the others. In other words, a sort of electronic card-index. And, in the same way that you can go through a card index looking for what you want, you should be able to do the same with a database.

In fact, you should be able to do much more, much faster, since a database exists on, and by courtesy of, a computer. Thus rearranging your information collection; adding new things and deleting old ones; rapidly locating specific items; all these and more should be simplicity itself.

The size of the information collection should make no difference - in fact and if anything, the bigger the database the more marked should be the advantage of the computer operation.

Putting it in a nutshell, the point at which the card index or similar manual system becomes unwieldy and unmanageable should be the very point at which a database starts to be an answer.

Now there are a number of database systems already in existence for PET, and every one of them has its own special advantages. Some are very expensive; some are exceptionally fast; some hold enormous amounts of information; some are very well laid out; some are very easy to set up; some are very easy to use; some have a large number of features; and so on.

Few if any, however, combine all these desirable factors (it's very doubtful, of course, that any single database could), and though it comes close, Compsoft's *DMS* is no exception. Nevertheless, in our opinion *DMS* has a very large number of features which make it an extremely good database system indeed.

Equally though, and again in our opinion, it has a few irritating shortcomings which, though they need in no way deter a potential purchaser, it is wiser to recognise. And even perhaps, Compsoft may feel, do something to cure?

Since a buyer of *DMS* will start with the manual that accompanies it, that should probably be our starting point too.

Now before we go further in what will be considerable criticism of the manual, we must make it very clear that Compsoft's normal approach is to sell *DMS* via dealers trained to help prospective users set it up and operate it.

Equally, Compsoft stand by their product, and offer a very considerable after-sales advice service to those who might have queries or problems. This service can be, and is, handled in a number of ways - by phone, or by letter, or even by a personal visit from Heather Kearsley, Compsoft's marketing director.

This last, it must be said, is an extremely attractive prospect, since Heather Kearsley is an extremely attractive lady. Indeed, it is rumoured that some users have discovered apparently intractable problems which, they have firmly averred, could *only* be solved with a visit from Heather.

Compsoft, therefore, back *DMS* and its users up to a remarkable degree. Be that as it may, however, we feel that the manual accompanying any relatively expensive and complicated software should be clear, understandable, explicit, well thought-out, well laid-out, and deficient in no respect.

It is with regret that we have to say we felt the *DMS* manual was muddled, hard to understand, unclear in many places, did not give the impression of having had a lot of thought given to it (though, poignantly, it almost certainly has), and seemed to us to be illogically ordered for much of its length.

And it *is* - elegantly ring-bound in a hard-wearing blue binder, it currently runs to 57 A4 pages which are presumably meant to guide the user into and through the considerable sophistication of the many parts of *DMS*.

Agreed the dealer, and Compsoft themselves, stand in the background waiting to offer assistance should the user run into difficulty or have a problem. We cannot help but feel, however, that *that* situation should only arise where the accompanying manual, without being voluminously long, cannot cover a specialised application or cirsumstances.

As it is, the present manual seemed to us to be so muddled and unclear in many of its explanations, and in much of the order of its sections, as to lead Heather Kearsley to being almost permanently in advisory contact with *DMS* users.

Though *DMS* users should enjoy the experience, that seems to us to be a very great shame, for *DMS* is, in our view, a very good database indeed, and remarkably well-priced for the many sophisticated features it offers.

Which brings us to *DMS* itself

Our review copy of *DMS* came as two disks in a pocket at the front of the manual, one disk being a back-up for the other. This was doubtless because an element of disk protection is built-in, such as to make it hard (but, we found, not impossible) to copy the master disk.

DMS consists of seven major programs, some of which are very long indeed. They are, in order:

- a menu from which any of the other programs can be called;
- DMSV1, the set-up, up-dating, sorting, retrieval and printing program;
-DMSSV2, which allows almost anyting to be done to an existing *DMS* database;
- DMSLIST, which provides for listings in a variety of formats, on paper or labels, of all or any part of an existing *DMS* database;
- DMSWORDCRAFT and DMSWORDPRO, both or either of which are optional, which link *DMS* data bases to the two best-selling word processors, and allow selected items from databases to be used as 'fill' items in standard letters.
- DMSSORT, which is similar to DMSLIST, but allows a larger sort to be handled by removing some of the DMSLIST features;
- DMSPASS to give password protection to confidential or otherwise sensitive databases.

The disk containing the suite of programs goes in Drive 0 on the CBM disk unit, or Drive 1 on the CompuThink disk unit (*DMS* is available for either), and a blank disk goes into the other drive.

The menu loads and runs directly from the standard command for either type of drive, and then displays the list of *DMS* programs for selection, plus the option of exit. This last is important, since all the *DMS* programs contain some well-planned idiot-proofing, the sum effect of which is to prevent almost totally the acceptance of any input except that allowed by the screen prompts. Thus, once a *DMS* program is loaded, there's no way out but that provided by the program itself. We tried hard to defeat it, but failed completely.

The first-time user will naturally select DMSV1, since this is the program which sets up the database, and formats the blank disk so that

it's ready to accept the data as and when supplied.

The formatting process doesn't, of course, take place until the parameters of the database have been provided by the user and here, as always, a degree of forward planning is advisable.

It's all too easy to set the outline of a database up, and then find later that it would have been better had this or that been included or put in a different order. Having said that, however, we found that one of the cardinal virtues of *DMS* was its ability to let you change your mind.

Hours, days, weeks or months later, if you want to change the shape and form of your database, you can very easily, without having, as with some other but otherwise excellent databases, having to enter every bit of data all over again.

Indeed, *DMS* allows you to spawn any number of databases (via the second program, DMSV2) from an original, each of which can contain more information categories, or fewer, or the same number but in a different order.

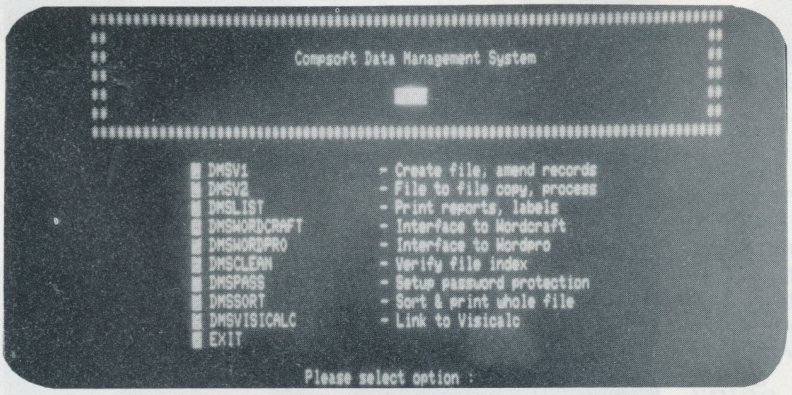
This is an obvious advantage for those who don't plan as well as they might and want to make changes later. There *are* some commercially available database programs which allow no change at all once they're set up, beyond going back to Square One for a completely new start.

The ability to change also caters for the ever-present possibility of a situation which itself changes, and thus calls for a new, revised or additional approach to the original overall database.

We felt, however, that the guidance which *DMS* provided on-screen to the setting-up of the database outline, and then to the placing of information in it, had some advantages and some disadvantages.

The initial set-up stages don't differ greatly from most other commercial database programs. A title for the whole data file is requested, followed by headings for the various fields which will make up each record to be contained in the file.

An indication is also required as to whether those fields are to be alphanumeric (called 'character' by *DMS*) or numeric. Choice of the latter allows calculations (which can be quite sophisticated) to be performed on the data in such fields later.


Comsoft Data Management System
DMSV1 - Create file, amend records
DMSV2 - File to file copy, process
DMSLIST - Print reports, labels
DMSWORDCRAFT - Interface to Wordcraft
DMSWORDPRO - Interface to Wordpro
DMSCLEAN - Verify file index
DMSPASS - Setup password protection
DMSSORT - Sort & print whole file
DMSVISICALC - Link to Visicalc
EXIT
Please select option :

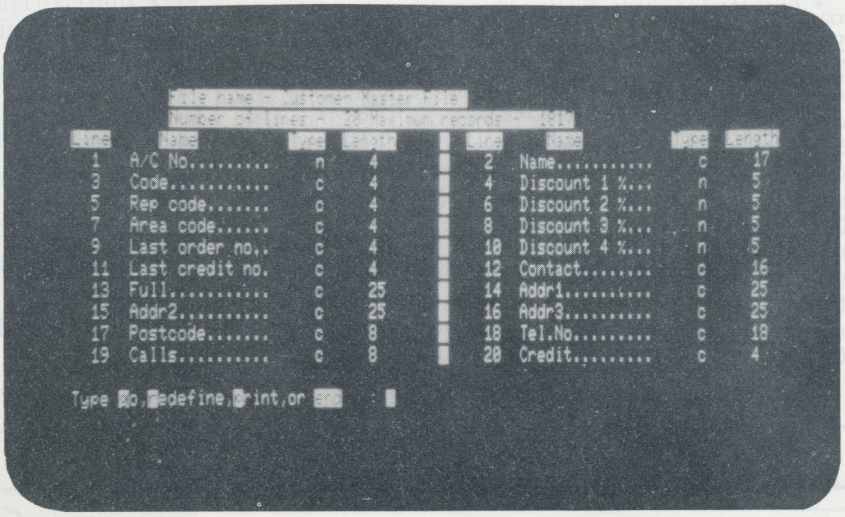
The required length to be reserved for each data field is also requested. It was here we found a disadvantage (for 3032 users) we've come across in other database software which, in *DMS*, could probably have been avoided.

There is a small reverse box on the screen throughout the set-up process. In the 3032, it remains blank until the end, when it then shows the total number of records which the whole data file, as constituted, will hold.

Unless, that is, the overall limits have been exceeded. In that case, you're firmly told that you've gone over the top and grimly sent back to start over again.

It seemed to us that a little extra programming for the 3032 version of *DMS* might allow the reverse box to show the reducing number of possible records, as extra fields and their proposed lengths were added. This would allow adjustments to be made, and quite possibly avoid the irritation of having to start all over again.

The irritation is compounded by the fact that the need for a new start usually comes as a complete surprise, and involves a repeat of all the preliminary stages, such as the disk which is to hold the data going through the 'new' process yet again, and so on.


File name = Customer Master File
Number of fields = 20 Maximum records = 1171
Line Name Type Length Line Name Type Length
1 A/C No..... n 4
2 Name..... c 17
3 Code..... c 4
4 Discount 1 %... n 5
5 Rep code..... c 4
6 Discount 2 %... n 5
7 Area code..... c 4
8 Discount 3 %... n 5
9 Last order no,. c 4
10 Discount 4 %... n 5
11 Last credit no. c 4
12 Contact..... c 16
13 Full..... c 25
14 Addr1..... c 25
15 Addr2..... c 25
16 Addr3..... c 25
17 Postcode..... c 8
18 Tel.No..... c 18
19 Calls..... c 8
20 Credit..... c 4
Type Go,Redefine,Print,or End :

It's a relatively small point, we know. It will not bother those who plan carefully ahead, and could only arise once for every database set-up. Nevertheless, commercial database programs are presumably meant for those who don't feel able to write their own. As we've inferred above, however, this problem doesn't exist on the 80-column version of *DMS* - you know where you are at all times.

It therefore seems to us that such software should be as helpful (and idiot-proofed) as possible. *DMS* may thus have missed (so far) opportunity to be a small step ahead of the competition.

But talking of being ahead of the competition, we especially liked the clear on-screen indication, once the database *was* set up and data was being entered, of exactly *how* much could be put into each field, before it exceeded the space reserved for it.

In using other database programs, we've been irritated by not being sure (without counting) how long a data entry we were allowed; going ahead and entering it anyway; and then being curtly informed that 'data entered exceeds limits'. This can't happen with *DMS* - you have a visual indication at all times of just how much space you've got.

We were just a little disturbed by what we felt to be rather crude screen layouts in DMSV1. There were a number of occasions when the screen scrolled up; all display was understandably in upper-case (unless lower-case had been chosen at the beginning) but spaces between lines seldom occurred; lines occasionally started and finished raggedly at left and right; and so on.

But to be fair, this is a very low-key criticism. A beautiful screen layout cannot excuse poorly programmed database software, whereas well-constructed software need not necessarily win prizes for its screen layout, provided the latter is at least competent.

And we've no hesitation at all in saying that *DMS* is very well constructed, and the screen layouts are adequate.

In addition to the set-up and data entry procedures, DMSV1 also contains data retrieval features, either by merely browsing through the file, or by searching for records satisfying criteria you specify.

The criteria you choose can be as simple or, within pretty wide limits, as complicated as you care to specify. Comparison with constants; records containing fields greater than, less than, equal to or not equal to anything you care to enter; or a combination of all these - *DMS* will almost always cope with it.

You may well, as we've noted earlier, feel considerable frustration in finding and understanding the necessary methods from the instruction manual, but *DMS* **does** have the capabilities.

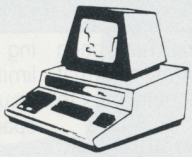
DMSV1 also provides sophisticated hard-copy print possibilities, linked if necessary to the data search and retrieval routines. Printing across the page or down the page, with or without the various field labels, and suppressing altogether one or more desired fields if required - again, all these are possible with DMSV1 (given diligent study of the manual!)

In fact, the entire keynote in DMSV1 (and the other programs in the total *DMS* suite) seems to be one of the most comprehensively flexible approaches we've come across in any commercial database program or programs.

For instance, you can modify any field description (a very simple process indeed, so a complete change is possible if required) by adding a special character at the start. Depending

continued on page **59**

VIGIL



INTERACTIVE GRAPHICS/GAME LANGUAGE

FOR THE PET/CBM

VIGIL is an exciting new interactive language for your PET/CBM micro. **VIGIL** - Video Interactive Game Interpretive Language - is an easy to learn graphics and game language that lets you quickly create interactive applications.

* More than 60 powerful commands permit you to easily manipulate graphics figures on the screen
* Double density graphics give you 80 X 50 plot positions on your 40 column PET/CBM
* Large number display capability, access to two event timers and tone generation (if you have ext. speaker)
* Load and save your **VIGIL** programs to cassette or diskette
* Nine interactive programs demonstrate the power of **VIGIL** - Breakout, SpaceWar, AntiAircraft, U.F.O., SpaceBattle, Concentration, Maze, Kaleidoscope & Fortune
* Comprehensive user's manual with complete listings of enclosed programs

VIGIL comes on cassette, or diskette ready to run on any 40 column PET/CBM micro with at least 8K of memory. Specify ROM-set when ordering. 6502 listing of the **VIGIL** Interpreter available separately.

	US & Canada	Foreign
VIGIL FOR Pet/CBM on Cassette or Diskette (w/9 programs)	$35	$40
VIGIL User's Mannual (refundable with software)	$10	$12
VIGIL Interpreter listing (6502 Assembly language)	$25	$30
PET MACHINE LANGUAGE GUIDE	$8	$10

VISA

master charge

ABACUS SOFTWARE
P. O. Box 7211
Grand Rapids, Michigan 49510

Prices include postage. Michigan residents include 4% sales tax. Orders must be prepaid or via bankcard (Mastercard, VISA, Eurocard, Access, etc.). Include card number and expiration date.

(C) 1981 by Roy Wainwright

WORDPRO

DMS — **VISICALC** — **WORDCRAFT**

Information stored in **DMS** can be automatically transferred into Wordcraft or Wordpro, e.g. if client records are stored, ask **DMS** to search for all those who didn't pay and/or bought model A1 and/or owe more than £5,000 and/or delivery is due on a particular date, then transfer name, address, amounts, results, etc. into standard letters via a 'fill-file'. **DMS** processes thousands of names and addresses without user attendance required. The most powerful AUTOMATIC mailing list available, producing weeks of work in only hours.

Also links to VisiCalc giving a direct automatic transfer or information for really sophisticated number crunching and statistical analysis.

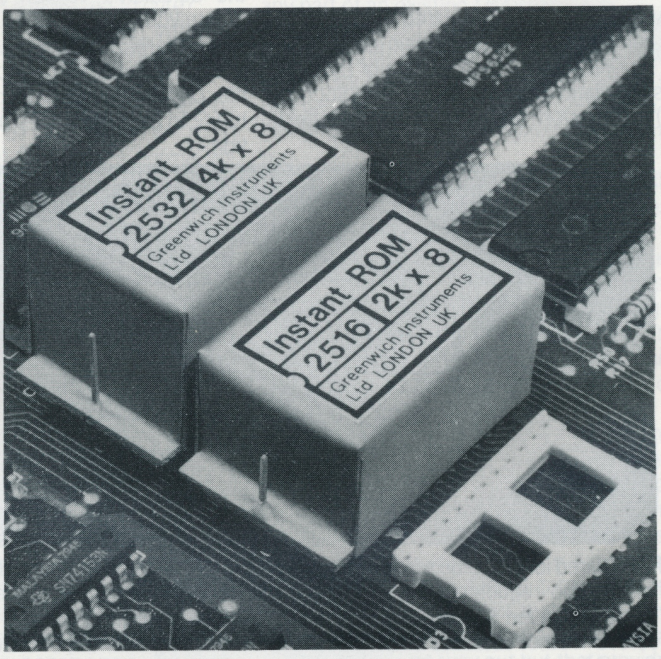
Compsoft Limited
Great Tangley Manor Farm
Wonersh
Guildford

Tel: 0483 39665/505918

INSTANT ROM™ for PET

(and other microcomputers)

Have you ever wanted to write programs that would stay in your PET permanently? Extend BASIC, write security programs, special print routines? And then put them into an EPROM and plug them into your PET?
Now you can do it quickly and easily - and you don't need an EPROM programmer!



INSTANT ROM is 2K or 4K of CMOS memory with battery back-up. Just plug it into the socket provided on your PET. Then write your program onto it as if it were RAM. Or load programs into INSTANT ROM from tape, disk, or some other part of memory. Then remove the Write Enable lead, and your prograsm is there, permanently — for years! Even when the power goes off! The computer automatically keeps the battery charged. You can debug it, add to it, alter it — instantly! You can change a single byte or even a single bit — no erasure problems. And you can copy other programs onto it in seconds.

See us at the PET SHOW, June 18-20th, WEST CENTRE HOTEL, Lillie Road, London SW6.

GREENWICH INSTRUMENTS LTD · 22 BARDSLEY LANE · GREENWICH · LONDON SE10 9RF · UK · 01-853 0868

HOW TO REDUCE SIGNIFICANT FIGURES.

I often use my PET computer for electronic calculations where a specific output may be the value of a resistor or capacitor and I find it disconcerting to be informed that a resistor value of 12345.67 ohms is required. The most accurate representation I am likely to require is to only three significant figures rounded up or down as need be. In the example above, 12300 ohms would normally be my preferred output. The following subroutine will take a calculated value 'a' and output as 'b' its value to three significant figures.

```
1000 c=int(log(a)/log(10))
1010 b=10↑c*int(100*a/10↑c+0.5)/100
```

If only two significant figures are required, then the two occurrences of 100 in line 1010 should be changed to 10.

A useful by-product of this sub-routine is that the intermediate value 'c' represents the number of digits to the left of the decimal point minus one, i.e. c-4 in the above example. This may be exploited to represent resistor or capacitor values in engineering notation. For example, 12300 ohms could be presented as 12.3K ohms. Adding the following lines to the above subroutine shows one simple method of doing this for resistors. Line 1060 gets rid of any funnies caused by the last statement in lines 1040 and 1050. Lines 100 to 140 show how the subroutine may be used.

```
1020 a$="ohm":b$="K ohm":c$="M ohm"
1030 if int(c/3)<=0 then d$=a$
1040 if int(c/3)=1 then d$=b$:b=b/1e3
1050 if int(c/3)>=2 then d$=c$:b=b/1e6
1060 b=int(100*b+0.5)/100
1070 return
```

```
100 poke 59468,14
110 rem calculate resistor value a
120 gosub 1000
130 print"R=";b;d$
140 end
```

The examples below show the capabilities of the subroutine when used to display resistor values. Minor modifications are required to enable the subroutine to handle capacitor values or any other measurement unit required.

INPUT a	OUTPUT b
12.34	12.3 ohm
123.456	123 ohm
98765.4	98.8 K ohm
1234567.8	1.23 M ohm

PEDRO COMPUTER SERVICES

PET/CBM IEEE–488 Printer Interface. Compatible with NEC Spinwriter and other Parallel Printers. Fully assembled and attractively enclosed. Addressable as Device No. 4 to 30. Switch selectable PET to ASCII code conversion. No software drivers required. **Price: £80.00**

RS232 Serial Interface. Baud Rate 110-4800. Includes Power Supply. **Price: £50.00**

UART & Baud Rate Generator. Converts Serial to Parallel and Parallel to Serial. On board Baud Rate Generator 110, 150, 300, 600, 1200, 2400. TTL compatible. All characters contain 5 to 8 data bits, 1 or 2 stop bits and either odd or even parity. **Price: £50.00**

RS232/TTL Interface. Converts TTL to RS232 and converts RS232 to TTL. Two separate circuits. Requires -12V and +12V. **Price: £10.00**

CB2 Soundbox. Ideal soundbox for any PET. Comes complete with user programming instructions and demo tapes. Plugs into PET user port and cassette port. **Price: £22.50**

4-Channel A/D Converter. Connect joystick to PET. Control temperature. Remote control the world. Comes complete with power supply and drive program. **Price: £45.00**

TV/Video Interface. This well-built unit connects to either your domestic TV or a monitor. Nothing to adjust. Connects to user port and second cassette port. **Price: £35.00**

8-Chennel Relay Switching Unit (Specify relay contact rating required). Supplied with drive program. **Price: £45.00**

65 GLEBE CRESCENT
KENTON, MIDDX.
HA3 9LB

Telephone 01-204 9351

BINDERS!

Don't Lose This Issue!

Don't lose this issue! Keep it safe in a smart Printout binder. Each one holds ten issues and has 'PRINTOUT' gold blocked onto the spine.

The price is just £3.95 (UK) inclusive of postage, packing and VAT. Eire £IRL4.50. Europe:£5. USA $12. Overseas £6.

Access / Mastercard / Eurocard / Barclaycard / Visa orders accepted by post or by telephoning 0635-201131.

PRINTOUT, PO Box 48, Newbury RG16 OBD. U.K.

NOW THERE IS ONE BOOK WHICH TELLS YOU EVERYTHING YOU NEED TO KNOW ABOUT COMPUTERS– AND NOTHING YOU DON'T!

THE GOOD COMPUTING BOOK FOR BEGINNERS
PLUS a complete practical glossary of terms
All you need to know about computers (and nothing you don't)
by Dennis Jarrett

It's called the Good Computing Guide for Beginners. But you don't have to be a beginner to read it. That's because it contains probably the most comprehensive glossary of terms on computing that you will find anywhere.

Apart from looking at how to choose computers, what goes on inside, programming, and dispelling all those computer myths, The Good Computing Book for Beginners tells you the difference between bits and bytes, housekeeping and joysticks, and operating systems and RAM. What's more it's all in easy-to-read language, as you would expect from Dennis Jarrett – noted journalist and former Managing Editor of WHICH COMPUTER? and *Practical Computing*.

Chapter 1
Introduction to the introduction – computer myths, why they are being dispelled, and the truth about computers.

Chapter 2
What goes on inside – a swift canter through the heavy technology, avoiding irrelevant and/or difficult ideas: processors, chips, memory, I/O.

Chapter 3
Programs – what makes the computer tick, or at least where the noise comes from: system software, applications, the pleasant and unpleasant faces of programming.

Chapter 4
What's a personal computer? – new readers start here, because this is all you need to know: what can it do? What's available? And where do you buy a computer?

Chapter 5
What to look for – how to buy a small computer, or at least how to avoid complete disappointment.

Chapter 6
A practical glossary – facts, opinions, references and a few personalities.

Chapter 7
Now read on – recommended reading, with notes.

All this for just £1.95

The Good Computing Book for Beginners, which runs to 304 pages, costs only £1.95. Can you really afford to be without it?

Please send me _____ copy(ies) of the Good Computing Book for Beginners at £1.95 each plus 50p for postage and packing.
☐ I enclose a cheque for £_____ made payable to ECC Publications.
Name _____
Address _____
_____
_____ Date _____
☐ Please charge my credit card the sum of £_____
Name of credit card _____ Number _____
Signed _____

Now post please to ECC Publications, 30-31 Islington Green, London N1 8BJ. Telephone enquiries: 01-359 7481.

NEW for COMMODORE COMPUTER for: 3000 Series 4000 Series 8000 Series

UPGRADE SYSTEM

3064, 4064 and 8064

Expand your CBM Computer for additional 64K Byte RAM (0r + 128 or + 192 etc.)

Up to 96K Byte RAM with SPIMA UPGRADE-SYSTEM for programs and datafiles. Price £490.00

I/O Expander adds 32 program lines to your CBM price £181.00.

Other products:

CBM 4032	£525.00
CBM 8032	£700.00
CBM 8050	£700.00
CBM 4040	£562.00
Epson MX80 F/T printer	£320.00
High res. graphics	£266.00
Multicluster	£468.00

and a lot more .....

All prices FOB Mannheim, West Germany

Dealer Enquiries welcome.
Prices FOB Mannheim, West Germany

Info from:

SPIMA · COMPUTER · GMBH

Turbinenstrasse 4 * D-6800 Mannheim-31 * Tel. ( ) 0621/721515 * Telex 0463708 spimad

WEST GERMANY

BASIC INTEGER COMPILER FOR COMMODORE SYSTEMS

- 50-150 times speed of Commodore Basic.
- Any length variable names.
- Single dimension string and integer arrays.
- Full Integer arithmetic & logical (1 byte variables) for extra speed.
- Code & Data can be set to reside anywhere in memory.
- Many facilities for interface with Commodore Basic programmes.
- New commands can be added to Commodore Basic automatically using WEDGE statement.
- Several extra low-level commands for precision I/O programming, eg DELAY, SETBIT, MOVE, etc.
- Automatic insertion of code into interrupt routine.
- Variables can be individually set to reside at any location allowing direct access to page zero I/O ports, etc.
- Full logical file handling.
- Compiling speed of 3 lines per minute.

Suite includes resident compiler, disk compiler, editor, loader and debugger. Editing environment and language similar to Commodore Basic. Produces ready-to-run 6502 Machine Code.

Detailed Manual ..... £15.00 inc. VAT

Compiler: 3000 series ..... £150.00 inc. VAT
8000 series ..... £150.00 inc. VAT

Oxford Computer Systems

5 Oxford Street Woodstock Oxford OX7 1TQ Telephone: Woodstock (0993) 812838

FREELANCE PROGRAMMERS FREELANCE PROGRAMMERS

PROGRAMS TO ORDER
Complete Programming Service
Management Consultancy support

Reasonable charges

Dr. A. L. Minter, FMS,
2 Whitefriars Way,
Sandwich, Kent CT13 9AD
Tel: 0304 61 7209

E.L. Mills,
1 Vanessa Way,
Bexley, Kent DA5 2JS

Specialist in designing and implementing systems based on 32K PET with CompuThink drives (400 or 800K).

TOMMY TURNBULL

49x9th Row, Ashington,
Northumberland NE63 8JY

Tel: 0670 819567

Alan Jones,

Freelance Programmer

98 Longlands Road,
Lewisham, London S.E.13.

MIDSOFT
2 BARCHESTON ROAD,
KNOWLE, SOLIHULL,
WEST MIDLANDS B93 9JR

Tel: Knowle 6884

JOHN SKINGLEY
Programming skills include BASIC Fortran, Pascal, PET machine code

Tel: Swindon 770021 (evenings)
Circle Software, 33 Restrop View,
Purton, Wilts SN5 9DG

MINE OF INFORMATION LTD
1 FRANCIS AVENUE,
ST ALBANS AL3 6BL
ENGLAND
Phone: 0727 52801
Telex: 925 859
MICROCOMPUTER CONSULTANCY & BOOK SELLERS

PROGRAMMERS

To advertise in one of these boxes costs only £10.20.
Contact Jonathan Horne on
025 671 2724

3 HIGH QUALITY PROGRAMS FOR THE PET

1. LOWER CASE LISTER - Lists programs to Commodore printer in lower case £8

2. DISK DIRECTORY - Indexes all your programs on all disks on one master diskette £15

3. SCREENSAVE TO DISK - Saves contents of screen to disk - can be recalled later without disturbing program in memory £5

SPECIAL OFFER **All 3 plus miscellaneous routines £22 on diskette**
Available from: **D. MILNES,**
13 DELMONT CLOSE,
WHITELEE ROAD,
BATLEY,
WEST YORKSHIRE

FOR SALE - 32K PET c/w TOOLKIT, COVER, RESET BUTTON, AND USUAL GAMES ETC. ALSO CBM 2040 DISK DRIVE IN IMMACULATE CONDITION. BOTH ITEMS £550 EACH. PRIVATE SALE. BRISTOL 312796.

Softcentre
OVER 150 PROGRAMS FOR CBM/PET
NOW INCLUDING ENHANCED
'MICRO-POOLS PACKAGE'
PLUS
Heaps of gear at reasonable prices from cassettes to complete systems
Whatever you want/whoever makes it it's probably in our massive range & our catalogue is updated almost daily.
SEND 20p STAMP FOR YOUR FREE COPY!
MOST MICROS BOUGHT, SOLD, REPAIRED
Top royalties paid on really ORIGINAL programs -- send cassette.
26 ALBANY ROAD
RAYLEIGH ESSEX
Callers strictly by appointment
(0268-774089) 1 P.M. - 8 P.M. Mon-Sat
OPTELCO

HIGH RESOLUTION GRAPHICS **320 x 200 Dot Matrix.**

for 2,3,4 and 8000 Series PETs

Special Offer: 2000 Series External Systems from £160.
Price includes FREE interface while stocks last. V.A.T. extra.
Don't delay. Ask for details of bargains to suit your needs.

I.J.J. DESIGN LTD., 37 LONDON ROAD, MARLBOROUGH, WILTS. 0672-54487

Business ROMs

continued from page 23

SCRINP (N) May be used only in program control. Places cursor in left hand edge of designated field waiting for input. SCRINP commands generally preceded by print statements followed by brackets, which limit response. Same restrictors apply as in RESPOND. Edit functions available.

INPUT FIELD Converts field N into simple string variable or array variable. Either INPFLD (N,A$) or INPFLD (X,R$(X)).

CLEAR FIELD Clears field or all fields; CLRFLD (N) or CLRFLD (*)

SEND FIELD/RECEIVE FIELD/MATCH FIELD These three available only under program control and only with BASIC 4 and DOS 2.1. SEND will send fields to a Relative file, whilst RECEIVE pulls them back. MATCH compares current screen fields with the fields comprising a relative file on a field by field basis. Match or fail is flagged (PEEK O).

I consider this set of routines will vastly simplify programming and also guarantee a greater reliability of data and a greater confidence on the part of the non-technical user. Very highly recommended.

Available price £120.00 plus VAT from: JCL Software, 47 London Road, Southborough, Tunbridge Wells, Kent. Tel: (0892) 27454.

L&J COMPUTERS

192 HONEYPOT LANE, QUEENSBURY, MIDDX. HA7 1EE

01-204 7525

ALTHOUGH WE HAVE MOVED TO LARGER PREMISES, WE ARE STILL GIVING THE SAME PERSONAL SERVICE THAT WAS OUR HALLMARK AT KINGSBURY.

WE CAN NOW PROVIDE EX–STOCK:

PAPER (Fanfold: Plain or Lined) & Rolls	ALL
LABELS All shapes & sizes	
C12 Cassettes	AT
DISKS (BASF & Verbatim)	
TOOL KITs (Basic 2 & 4)	REASONABLE
DUST COVERS (Pet, D/Drives & Printers)	
INTERFACES Uni & Bi-directional	PRICES
BOOKS All the popular ones, + a lot more	

PLUS, OF COURSE, THE FULL RANGE OF COMMODORE MACHINES AT AFFORDABLE PRICES....NOW EX–STOCK

SOFTWARE

As well as a full range of Petsoft and Commodore Software, we have some highly reliable "Home-Brewed" programs available.

STOCK CONTROL & INVOICING **£60**
(Handles up to 500 items — 32K) (180 on 16K). Stock depleted on invoicing, search etc. Cassette, disk (& print option).

CASH BOOK **£90**
Enter daily/weekly amounts — printout and totals, weekly/monthly analysis, totals and balances.

Plus many more. SAE for free software booklet.

2 FOR JUST OVER THE PRICE FOR 1!
We now have limited stock of NEW CASSETTE DECKS, with built-in COUNTER + SOUND BOX FOR PETs.
AT ONLY £65* EACH.
Orders dealt with in strict rotation

*** PRICES DO NOT INCLUDE VAT**

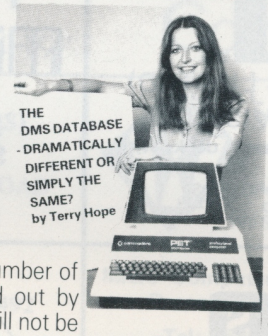
PERSONAL SHOPPERS WELCOME
Phone & Mail Orders accepted.

BARCLAYCARD VISA

ALL GOODS SENT SAME DAY WHEREVER POSSIBLE
LARGE S.A.E. FOR LISTS ETC.

continued from page 53

DMS



on the special character you add, a number of operations will or will not be carried out by DMSV1 during its print cycle, or will/will not be performed by other programs in *DMS*.

There was, however, one particular inflexibility which we found annoying, and that was the predetermined length of the printed page produced in *DMS* hard-copy reports.

The programs contain Commodore printer 'paging on-paging off' instructions, which assume that the user has continuous stationery of the 11" length variety. There is no reference we could find in the manual to this, nor could we easily change the program to accommodate longer paper lengths.

This was partly due to the fact that the programs themselves are very complex, and partly due to the fact that the line numbering is, to say the least, erratic.

With the many questions which *DMS* poses to the user before carrying out various operations, and the flexibility of those operations, it seemed to us that *DMS* might reasonably also have asked 'what paper length are you using?', and modified its paging accordingly.

Before leaving DMSV1 (and there are many additional features in it we have no space to cover here), we must finally note one other considerable bonus point. This is the number of records which can be held on one disk.

Assuming a record length of 240 characters, a total of 650 records can be stored on a CBM 3040 disk, and a total of 1,800 on a CBM 8050 disk. A record length of 60 allows a much larger number to be contained on a disk - 2,500 on the 3040 and 7,000 on the 8050.

The other major program in *DMS* is DMSV2, which broadens dramatically the possibilities open to the user.

Basically, DMSV2 allows either file-to-file copies to be made, or processing operations to be carried out on existing files. To say simply that, however, is akin to saying that Pisa in Italy has a building which is a bit out of true.

DMSV2, for instance, allows a file-to-file copy to be made which either adds to the number of fields (providing the permissible total isn't exceeded), or deletes some of the existing fields. The data base with which you begin therefore can act as a progenitor for any number of succeeding databases, each of which is a variation on the original. This is not a common feature, and we found it very valuable.

The DMSV2 processing option is also sophisticated, in that it permits data to be switched around between fields, or replaced by supplied constants, or in the case of numeric data, to have a considerable number of calculations performed on it before being rewritten to the same or a different place in the file. Again, we found this very impressive.

And 'impressive' must be, we think, the word we must use to describe *DMS* as a whole. It contains other and slightly lesser programs we've already mentioned earlier in this review. Together, all of them will represent a complete answer to almost all the data handling operations most people are likely to need.

DMS does have some drawbacks, the most major of which is undoubtedly the poorly arranged and pretty obscure manual which accompanies it. True, this must be offset to a large extent by the advice and back-up provided by Compsoft's dealers, and Compsoft themselves. But that can be no substitute for a clear, concise and informative text, provided with the program, and permanently on hand for reference. It's only in that way that the best can be obtained from any complicated software.

That said, *DMS* undoubtedly represents extremely good value for money. It's one of the most flexible and comprehensive database program suites it's been our good fortune to examine. We think there is little it cannot do for the great majority of users, and it contains many features many users will expand up to, which must be better than discovering limitations almost from the start.

All in all, we've no hesitation in recommending *DMS* very highly indeed.

FOOTNOTE

Since this review was completed, but just before we went to press, we heard from Compsoft that the entire DMS manual is to be rewritten from start to finish, and additionally is to include a comprehensive index to help the reader find his or her way around.

While we can't comment on a manual that we haven't (for obvious reasons) yet seen, this is good news indeed. Even a casual reader of the review above will have detected a considerable enthusiasm on our part for the DMS database, tempered only by the manual which accompanied it.

If the manual is lucidly rewritten, as it seems that it will be, then our endorsement of DMS is correspondingly heightened. And we're delighted (but knowing Compsoft, not greatly surprised) that a PRINTOUT review should obtain such rapid results.

Where to buy your CBM-PET

MICRO COMPUTER CENTRE
Virage Holding Co. Ltd.
28 Sheen Lane, London S.W.14.
Tel: 01-878 7044/5/6/7

PETALECT
ELECTRONIC SERVICING LTD.
Chertsey Road
Woking
Surrey
Tel: Woking 21776/23637

AUGHTON
MICRO SYSTEMS
Woodward Road, Kirkby,
Liverpool, L33 7UZ
Telephone: 051-548 6060
Telex: 628681

IBEK SYSTEMS
COMPUTER SYSTEMS
COMPUTER PROGRAMMING
ELECTRONIC DEVELOPMENT
437 Stoney Stanton Road,
Coventry CV6 5EA,
West Midlands. Tel: (0203) 86449

EXECUTIVE REPROGRAPHIC
and business consultants ltd.
2/4 Oxford Road,
MANCHESTER M1 5QA
Tel: 061-228 1637

THE BUSINESS SYSTEMS EXPERTS...
DEVON COMPUTERS
81 Upper Manor Road PAIGNTON Devon TQ3 2TH Tel 0803 526303

ACS ACS ACS ACS
for the simple computer system that expands with your farming needs
Low cost: Recommended total package around £3000
ACS agricultural COMPUTER SERVICES
Agricultural Computer Services
Roundabout Farm, Thurning
Norfolk. NR20 5QS
Telephone Melton Constable
(026 386) 847 or 827

TAL
(TYTHE AVIATION LIMITED)
COMPUTER DIVISION
Suppliers of alternative cassette decks with counter and audio monitor.
11 HIGH STREET LEIGHTON BUZZARD BEDS
TELEPHONE LEIGHTON BUZZARD - 372114

HSV Limited
Microcomputers
22 Southampton Street,
Southampton SO1 2ED
Tel: 0703 22131

HSV Limited
Microcomputers
May Place
Basingstoke RG21 1NX
Tel: 0256 62444

CSS
Calculator Services & Sales (Bristol) Ltd.
192 Wells Road
Bristol BS4 2AX
Telephone: Bristol 779452 Sales
Bristol 779453 Service

MICRO ASSOCIATES
MICRO COMPUTERS AND BUSINESS SOFTWARE
471 Lichfield Road,
Aston, Birmingham
Tel: 021-328 4574

Computershop
FOR PROFESSIONAL BUSINESS SYSTEMS
Church Street, Reigate. Phone (07372) 22244

Preston Computer Centre
6 Victoria Buildings,
Fishergate, Preston.
Tel: 0772- 57684

PROFESSIONAL COMPUTER SERVICES LTD.
143/145 Yorkshire Street,
Oldham, Lancs. OL1 3TH
Telephone: 061-624 4065

SMC
SOUTH MIDLANDS COMMUNICATIONS LTD.
Northern Branch: 257 Otley Road,
Leeds LS16 5LQ
Tel: 0532-782326

MMS
Computer Systems
Registered Office:
26 Mill Street, Bedford MK40 3HH
TEL. 0234-40601

CSM
Computer Services Midlands Ltd.
Complete Computer Systems ● Consultancy
● Programming Service ● Supplies
First Floor Refuge Assurance House Sutton New Road
Erdington Birmingham B23 6QX 021-382 4171

Sumlock Manchester

SUMLOCK MANCHESTER

196/198 Deansgate
Manchester M3 3WE

Tel: 061-834 4233

BUSINESS ELECTRONICS

'The Microcomputer Specialists'.
ROWNHAMS HOUSE, ROWNHAMS,
SOUTHAMPTON SO1 8AH
Telephone:
SOUTHAMPTON (0703) 738248

LOWE ELECTRONICS

Bentley Bridge
Chesterfield Rd.
Matlock
Derbyshire DE4 5LE
Tel 0629 2430 or 2817
Telex 377482 Lowlec G
FOR CBM AND A GREAT DEAL MORE

BUSS STOP COMPUTERS

Photo Acoustics Ltd.

255a St. Albans Road
(entrance in Judge Street)
Watford Herts WD2 5BQ
Tel: Watford 40698

JRW

J. R. WARD COMPUTERS LIMITED

35 Potters Lane
Kiln Farm
Milton Keynes MK11 3HG

Telephone No
Milton Keynes
562850
(STD 0908)

Dataview LTD.

MICROCOMPUTER SYSTEMS

9 Church Street Colchester Essex CO1 1NF
Tel 0206 78811 and 63377
Telex 987562 COCHAC

MICRO FACILITIES

129 High Street, Hampton Hill,
Middlesex TW12 1NJ
Telephone: 01-979 4546 & 941-1197

---

30 Laka Street, Leighton Buzzard
Bedfordshire. Tel. (0525) 376600
24 hour Answering Service

Micro Computer Systems
by
CompUtopia LIMITED

CCS

CCS MICROHIRE
and
CCS MICROSALES
7 The Arcade, Letchworth
Herts, SG6 3ET

Tel: (04626-73301

CSE

C.S.E. (COMPUTERS)

12 WOKINGHAM ROAD
READING RG6 1JG

Telephone: Reading (0734) 61492

WALTERS COMPUTER SYSTEMS LTD.

FIELD HOUSE,
107 WORCESTER LANE,
STOURBRIDGE,
WEST MIDLANDS, DY9 0SJ

Micro Computers - Software packages
Bespoke Programming - Supplies
Tel: 0562-885937/995309

SUMLOCK BONDAIN

SUMLOCK BONDAIN LTD.

263–269 City Road,
London EC1V 1JX
Tel: 01–250 0505

IJJ

HIGH RESOLUTION GRAPHICS (320x200)
£320 delivery from stock

IJJ DESIGN LTD.
37 London Road,
Marlborough, Wilts
Tel: 0672-54487

---

cytek

COMPUTER APPLICATIONS
PET specialists, Commodore appointed
Commercial systems dealers
9 Warwick Road, Manchester 16
Tel: 061-872 4682

---

imPETus
Computer Systems

FOR AN INDEPENDENT DEAL
(AND A GREAT DEAL MORE)
plus
Programming software services
PHONE
IMPETUS COMPUTER SERVICES
on 01-202 2726 or 01-202 9630

SUPER VISION

13 ST. JAMES ROAD
SHIRLEY, SOUTHAMPTON
PET EQUIPMENT HIRE SPECIALISTS
Ex-hire machines available.
Tel: Southampton 774023 or 554488

---

c s
ca is
cad dis
cadd ddis
caddi addis
caddiscaddis
caddi addis
cadd ddis
cad dis
ca is
c s

Specialists in micro-computer applications

Caddis Computer Systems Ltd

72-74 Trinity Lane Hinckley Leicestershire LE10 0BH
0455-613544

Megapalm Software

Megapalm Limited,
Halton Road, Nether Kellet,
Carnforth,
Lancashire LA6 1EU
Telephone: 0524-733801

Microchips [Winchester]

MICROCOMPUTERS AND A GREAT DEAL MORE
66 St George s Street Winchester
Hampshire SO23 8AH Tel 0962 68085

KINGSLEY COMPUTERS LTD
132 DESBOROUGH RD HIGH WYCOMBE
BUCKS. HP11 2PU TEL (0494) 449749

---

adda

Adda Computers Ltd.
14 Broadway
West Ealing
London, W13 0SR Tel: 01-579 5845/8

PUT YOUR MICRO TO WORK

CONTROL MACHINES, ROBOTS, FACTORY OR HOME

Have you every wanted your MICRO to control a machine for you, or manage your house? If so, the **MDR 'MICRO–COMPUTER CONTROL INTERFACE'** will give you isolated channels of OUTPUT (8A @ 250 volts) and switch sensing INPUTS.

Available now for connection to PET USER PORT, RS232 and IEEE488, allowing expansion up to more than 900 channels.

Supplied complete with connecting cables, full data and guarantee from £12.54 per channel. Complete preprogrammed systems or individual components available. Write or phone for details.

M D R (INTERFACES)
Little Bridge House, Dane Hill, Nr. Haywards Heath, Sussex RH17 7JD
Telephone: 0825–790294

Get Organised!
& be a better programmer.

Treat Yourself to a Prog-Planner from Valsoft.

***RING BINDER** Keep everything together and where you want it

***Programme Sheets** to suit P.E.T. for fast entry.

***Variables Log** Now you can keep touch of constants available—what's used & where.

***Sub Routine Record**

***Screen Layout Grid** Quicker & easier than going direct onto screen this overlay is invaluable

***Clear Folder** holds programme floppy or cassette

*Make the most of your keyboard time by getting it right on paper first.
*Ideal for schools. colleges & all P.E.T. programmers
*Designed & produced by **Valsoft**—*software that works beautifully.*
*Available by post at only **£8.00** inc postage & packing.

SPECIAL Big Discounts on PET Hardware E.G. 32K PET at 16% Discount on equiv rec. retail price! Send large S.A.E. for details.

SPECIAL If you ve written anything for P.E.T. Send your tape to us with £1 and we'll return your tape. together with a complete PET printer listing + Our experts evaluation of your programme—we may even make you an offer for it. YOUR SECURITY IS GUARANTEED

MR MICRO
78A Partington Lane Swinton, Manchester M27 3NG

Peeks & Pokes

I suppose it was just a matter of time, but Californian couples are now being married by computer. The 'Reverend Apple', a pastor in the Universal Life Church, was ordained by its 26 year-old Archbishop, Ron Jaenish. My friend John Barry of *Infoworld*, who was a witness at one such digital nuptual, says the betrothed were asked: "DO YOU TAKE EACH OTHER AS SPOUSES? PRESS Y FOR YES, N FOR NO". Jaenish believes that there is good scope for computerized funerals and weddings for deaf people. So far organizations for the deaf have failed to respond to this idea.

I see that Commodore are sponsoring the San Francisco Performing Arts Society. Promising young actors, jugglers and balancing acts are despatched to Commodore HQ for advanced training.

A courtesy call to the Palo Alto fastness of my friend Gregory Yob finds the laser-wielding PET maestro in pensive mood. "Telecommunications is the future of personal computing," he muses. "If the product doesn't have a *full controllable* built-in modem it won't sell three years from now." By fully controllable he means the capability to automatically originate and answer calls. I blanch at the thought of the telephonically hyper-active John Chew installing such a device.

To Slough, where, having sold the company Rolls, Big Bad Bob is dying to demonstrate the amazing speeds attainable by the new Gleadow-mobile. When, at 125, I discreetly draw his attention to a police car behind us, he responds with a gleeful "Let's race 'em!" I am not optimistic about his chances of convincing the notorious Windsor "Hanging" bench that his foot slipped.

Duncan Campbell's *New Statesman* story about computers at the Government's phonetapping centre automatically transcribing intercepted calls caused a political storm last year. It was all nonsense, of course, despite endorsement by such luminaries as PCW's Guy Kewney. What actually happens is that calls are intercepted at the subject's local exchange and routed to the Pimlico centre. There the speech is digitized and stored on disk. This means that calls can be retrieved instantly for playback without having to wind through miles of tape recordings. Transcription is via the time honoured method of headphones and typewriter. Ironically it has been Campbell's own friends on the Loony Left who have been most inconvenienced by his "revelations". Now the paranoid proto-revolutionary don't dare use the phone at all.

Contrary to statements emanating from the U.S., British VICs are not in production in Japan. In fact they will be made in Germany, where production isn't scheduled to start until late June at the earliest. The good news is that the VIC printer will sell for less than £200. Just.

I look forward to some entertaining reviews of micro punditturned-manufacturer, Adam Osborne's new £850 briefcase computer. There is scarcely anyone in Silicon Valley who has not received a public wigging from the acerbic Englishman. Osborne stoutly denies that his present back trouble was sustained attempting to lift the "portable" wonder.

The next round of price cutting will be as a result of the arrival of flat screen displays to replace the bulky, fragile and expensive cathode ray tube. Toshiba showed a calculator sized liquid crystal display TV at CES; Sinclair has one; Exxon's Kylex Corporation are already in production with an 8-line LCD panel; while Commodore are working on plasma and electroluminescent displays as well.

A for Effort to the wellknown North Country dealer who amended the royalty figures on his Commodore contract when Big Bad Bob left the negotiations for a leak. If Mr B*rnst**n would care to send me the usual fiver I will ensure that his part in it does not come to light.

Following my story about the record 'My PET- How Basic can you get?' by ex-Moody Blue Patrick Moraz, I have received a press release explaining that it is "The start of a new computerized relation between image-graphics and sounds. A supra-technographic-music-analysis standardized and inter-connected to become a vocabulary of sounds-images together." Which no doubt explains the following lyrics:

"Can I touch your terminal?
I want to feel your potential
My PET, my PET, my PET, Mupet, Mupet, Mupet
I wanna be your pupett."

by Inside Trader

BIRMINGHAM COMPUTER CENTRE

£475
SPECIAL OFFER TO PRINTOUT READERS

New low cost printer for Commodore
High Speed Matrix 9x7 plus PET Graphics
Plugs Direct into PET-NO-INTERFACE
COMMODORE 3022 PRINTER... Now at a NEW LOW PRICE

Camden Electronics

4402 COVENTRY ROAD, SMALL HEATH, BIRMINGHAM B10
TEL. 021 · 773 8240

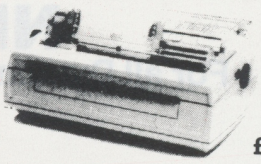
NO FRILLS, NO GIMMICKS, JUST GREAT PRINTER DISCOUNTS!

Epson MX80

9x9 dot matrix. Logic seeking. Bi-directional 96 ASCII characters 64 graphics and 8 International characters Centronics I/P with option RS232 and IEEE 488.

£359 + VAT

NEC Spinwriter



- for the professional word processing system

£1390 + VAT

Model 5510-RS232, Model 5530 Centronics 8 bit par. 128 ASCII chs. 5 copies. Friction or Tractor fed. 55 chrs. per second.

OKIDATA MICROLINE 80

The small, quiet, light, highly dependable printer with three way paper handling. Single sheet/roll/pin feed. Assured reliability and quality.

£329 + VAT

CENTRONICS 737

— Letter quality printing now available at a substantially reduced cost from the printer experts.

£349 + VAT

NORTHAMBER LTD

GREAT OAK HOUSE, ESHER, SURREY. KT10 9BR
Phone: ESHER (0372) 62071 & 01-786 2072
Full details on request. Prices exclude VAT & delivery

LONDON COMPUTER CENTRE

DAISY WHEEL PRINTER II

puts you a cable length away from **letter quality printing.** Sixty characters per second. Bolding, underlining and lots of other features.

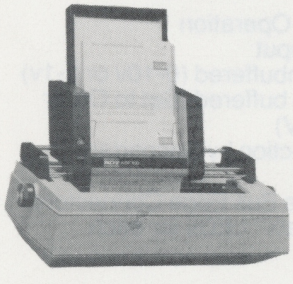
Works on WordPro or Wordcraft WP systems complete with tractor and PET addressable interface **£1160**
Optional extra: Sheet Feeder £550
MX80 F/T MX100 dual print modes.
Correspondence quality. Standard Dot Matrix.
Letter-like Print Quality.
3-Way Paper Handling:
1. Letterheads or A4
2. Fanfold.
3. Paper rolls.

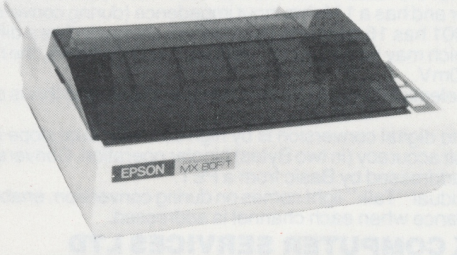
Low Noise.
The quietest dot matrix printer.

132 columns per line.
Directly replaces big expensive printers, e.g. Texas 810, Centronics 700.

High Reliability.
Precision engineered by Shinshu Seiki, a subsidiary of Seiko Watch Co. of Japan.
MX80 F/T 10-inch platten with PET interface £450.
MX100 F/T 15-inch platten with PET interface £625.

Dial 01-388 6991/2 for fast action and service.
FOR A DEMONSTRATION CALL INTO:





43 GRAFTON WAY, LONDON W1P 5LA (Opposite Maples)
Tel: 388 6991/ 2 OPENING HOURS: 11-7 MON-FRI 12-4 SAT
24 hour answer phone: 01-388 5721

Matrix Rom for Pet £35 plus VAT

NEW FROM STACK

For all Dynamic RAM PETS (3008-3032, 4008-4032, 8032)
(state which)

* Matrix Functions on a chip see detailed panels
* Fully integrated with Basic
* Does not interfere with toolkit
* Fits in right hand ROM slot
* Fast machine code operation
* Repeat key
* Simple easy to use instructions
* A must for scientific, statistical and mathematical users

1 Matrix 1 = Matrix 2
2 Matrix 1 = Matrix 2 + Matrix 3
3 Matrix 1 = Matrix 2 − Matrix 3
4 Matrix 1 = Matrix 2 * Matrix 3
5 Matrix 1 = Expression * Matrix 2

6 Matrix 1 = Transpose (Matrix 2)
7 Matrix 1 = Zero Matrix
8 Matrix 1 = Unity Matrix
9 Matrix 1 = Identity Matrix
10 Repeat Key Function

To Stack Computer Services Ltd

☐ Please supply ( ) Matrix Roms for Pet Model _____

☐ I enclose a cheque for £

☐ Please add me to your mailing list.

Stack Computer Services Ltd
290-298 Derby Rd, Bootle, Merseyside **051 933 5511**

Trade enquiries welcome. _____

STACK

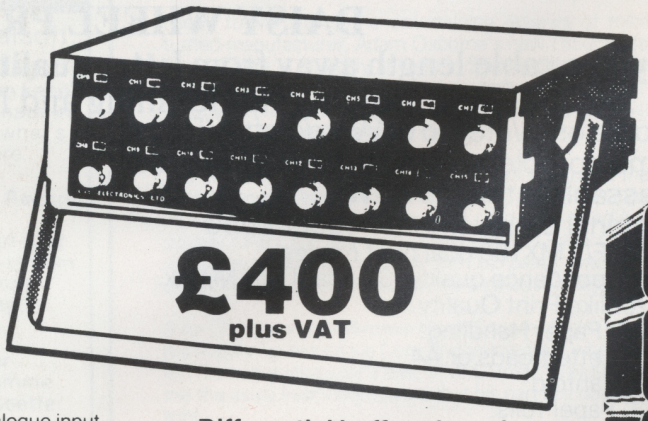
To order State which model Pet and send a cheque for **£40.25** payable to **Stack Computer Services Ltd.**

ANOTHER USEFUL PRODUCT FROM STACK

Yet another useful product from STACK

PCI 1001/1 A/D CONVERTER

16 CHANNEL
12 BIT BIPOLAR
IEEE INTERFACED



FEATURES:
- 12 Bit Bipolar Operation
- 16 Channel input
- 2 Versions Unbuffered (0-10v or 0-1v) or Differential buffered (Set to Order down to 10mV)
- Channel Selection by Secondary Address
- 2 "PET" Type Bus Edge Connectors
- Individual "Talk" LEDs for each Channel

The PCI 1000 and PCI 1001 are 16 Channel Multiplexed analogue input interfaces for the IEEE BUS. The PCI 1000 has inputs direct into a CMOS multiplexer and has a 1 Mohm input impedence (during conversion) whereas the PCI 1001 has 16 separate input buffers connected as a differential input, each of which may be ranged to customer's requirements, the minimum span being ± 10mV.
Channel selection is made by secondary address, and this is controlled by software.
Analogue to digital conversion is by high accuracy dual slope integrator giving 12 bit accuracy (in two Bytes) bipolar operation. Conversion time is 50 ms when addressed by Basic from a PET.
Each individual "Talk" light comes on during conversion, enabling the user to see at a glance when each channel is addressed.

STACK COMPUTER SERVICES LTD
290-298 Derby Road, Bootle, Merseyside.

Differential buffered version
FSD 10mV PCI 1001
£625 plus VAT

For details of all our range of data acquisition and control products please ring Roger Parkinson on 051-933 5511

STACK COMPUTER SERVICES LTD

APPROVED BY COMMODORE

PETAID

THE TOTAL INFORMATION SYSTEM

FAST BASIC — DATA RETRIEVAL
DATABASE
SYSTEMS SKELETON

STAGE ONE SOFTWARE

THE PRIME PET SOFTWARE SUPPLIERS

Manuals

Are clearly written and provide the user with worked examples to ensure a satisfactory installation.

Technical data

Equipment	3032 or 8032 with 3040, 4040 or 8050 versions also available for Computhink 400K and 800K
Language	BASIC
RAM Requirements	32K
Maximum no of files in Database	Unlimited
Maximum Record Size	512 Bytes
Minimum Record Size	64 Bytes
Maximum number of records per disk	2400
Maximum number of volumes in file	Unlimited
Record Structure	As you wish
Sorting	User defined fields
Record Access	Keyed Access/Indexed Access
Calculator functions	+ − × ÷ % Compare, Integer, Round Exponentiate
User Language	English/mnemonics
Program Steps	10 per field
Print Output	User defined page or list
Print Page Length	As you wish
Page Heading, Footing, Numbering, Top of Form	As you wish
Maximum Number Print Formats	Unlimited
Selection/Analysis Criteria	Full Search facilities — Boolean and string location etc. etc.

DEALER

STAGE ONE SOFTWARE
6 CRITERION ARCADE
OLD CHRISTCHURCH RD.,
BOURNEMOUTH
TEL: 23570 or 295395

The information contained within is relevant to all PETAID versions subsequent to PETAID version 4.2 with Report Generator except for Computhink versions.

BIZCHIP

Enhances Commodore BASIC4 with 21 new commands.

Designed for the serious programmer of business and scientific systems.

Aids programming and execution of business and scientific systems by replacing commonly used BASIC routines with fast machine code.

Simply plugs into a spare ROM slot in the CBM 8032, CBM 4032 or BASIC 4 upgrade of the CBM 3032. - Toolkit compatible.

Commands include ;

advanced string handling
- * truncate trailing spaces
- * count leading spaces
- * invert upper/lower case
- * force all lower case to upper

unbreakable input
- * left, right or un- justified
- * allows commas etc
- * cursor confined to input field

numeric validation
- * check string field to be
  - any number)
  - integer) or any
  - money) combination
  - positive) of these
  - negative)

automatic/manual screen dump to printer

packing and unpacking of data
- * save 50% of your disk space

fast reading of records from 8050 disc
- * reads upto 255 chars from disk in one go

bell control (8050 only)

conversion from CBM to ASCII codes

stop key enable and disable

Only £35 for BIZCHIP and manual
or 40p and large sae for manual only

Please state address required for the chip eg 9000 or A000

P.T.O. for example subroutine to see how **easy** it is to use and how much **smaller** it is and how much **faster** it is to execute.

Fine Curtis & Gross
Room 3, Hamilton House, Mabledon Place, LONDON WC1H 9BD
01-388 7345/6

```
1000 rem "BASIC" subroutine to input and validate pounds and pence
1100 rem
1200 input "Enter Amount";a$ :rem unprotected input
1300 if len(a$)>8 or len(a$)<3 goto2000 :rem too long or too short
1400 dt=0 :rem set dot count = 0
1500 for c=1to len(a$) :rem examine each character
1600 ch$=mid$(a$,c,1)
1700 if ch$>="0" and ch$<="9" goto2100 :rem digits 0-9 okay
1800 if ch$="." then dt=dt+1:rem count the dots
1900 if ch$="-" and c=1 goto2100 :rem minus only okay as char 1
2000 print"Invalid" :gotol200
2100 next
2200 if dt<>1 or mid$(a$,len(a$)-2,1)<>"." goto 2000 :rem pence okay
2300 a$=right$(x8$+a$,8) :rem right justify in 8 chars
2400 return
```

OR

```
1000 rem "BIZCHIP" subroutine to input and validate pounds and pence
1100 rem
1200 a$=x8$ :£inputr,a$ :rem protected 8 char input
1300 £n,a$,2 :if peek(0) then print"Invalid" :gotol200 :rem validate
1400 return
```

You can see the difference in the amount of coding. The 'BIZCHIP' is 25 times faster. Dont DELAY - BUY ONE TODAY.